THE IRON TRADE REVIEW

Volume LVI Cleveland, May 13, 1915 *No. 19*

Railroad Inquiries Are Large

Steel Trade Encouraged by Heavy Car and Rail Requirements—Domestic Trade Improves, But War Demand Heavy

With the broadening of domestic demand, accentuated by numerous inquiries for railroad equipment, the steel trade moves forward another lap in its march of improvement. Just at a time when a slight halt was noticeable in some finished lines, added impetus has been given the industry by the announcement of these enormous requirements which will involve the placing of 30,000 steel cars, divided almost equally between eastern and central western lines. Large rail orders also are pending, including 8,000 tons for the Central of Argentine railroad and 138,000 tons for the Pennsylvania. The Rock Island has awarded 10,000 tons of rails to the Illinois Steel Co. War orders that have played so conspicuous a part in recent satisfactory developments show no abatement in size or number. The Lackawanna Steel Co. will roll 30,000 tons of 65-pound rails and track fastenings for Russia and the American Locomotive Co. and the New York Air Brake Co. have made inquiry for 27,000 and 12,000 tons of steel bars, respectively, to fill shrapnel contracts. In addition, the Cambria Steel Co. will furnish Russia with 20,000 car axles and an order for 25,000 to 50,000 car wheels has been received from one of the war nations. The Baldwin Locomotive Co. will erect a new plant for the manufacture of ammunition, the contract for the building, involving 8,000 tons of steel having been awarded the McClintic-Marshall Co.

No Hesitancy Apparent

It is too early to gage the effect of threatened international complications following the sinking of the Lusitania and several American vessels, although no hesitancy is yet apparent among buyers, nor has the placing of orders been deferred from this cause. Ocean freight rates and cargo insurance have stiffened, although export tonnage has not appreciably declined. Increased trade activity is reflected by the decline of 23,446 idle cars in April as compared with the previous month. The unfilled tonnage statement of April 30, issued by the Steel Corporation, occasioned no surprise in the trade, as shipments throughout the month were heavy and it was not expected that new tonnage would keep pace with the output. In spite of the heavy shipments, the unfilled tonnage declined only 93,505 tons, the total of 4,162,244 tons, however, being the smallest since December. Steel Corporation operations this week may reach 80 per cent, which is the best record since early last year, and last week the ingot capacity was slightly in excess of 75 per cent.

Pig Iron

Following the recent activity, the pig iron market has settled down to a normal pace with recently established quotations well maintained, particularly in the south. Chicago reports scattering inquiries, aggregating 30,000 tons, of foundry grades principally. Central Ohio malleable plants have taken 6,000 tons and the sale of two lots of basic of 15,000 and 4,000 tons, respectively, resulted in a 15-cent advance to $12.65, valley. During the month of April eastern pig iron stocks showed a tremendous decline. Announcement has just been made that the Mesabi ore range rate reduction to 55 cents will become effective June 1 in place of June 15.

Structural lettings last week aggregated 23,000 tons. Further arrivals of ferro-manganese amount to 8,000 tons and the total shipments since the English embargo was lifted now approximate 10,000 to 12,000 tons.

Facts About Allis-Chalmers Case

What the Searchlight Reveals When Turned on Samuel Pearson—German Government Not Officially Connected With Case—Action Cannot be Sustained

WHO is Pearson and whom does he represent? What basis has he for action and what can he do?

For two weeks, ever since the startling news was flashed over the wire that an American citizen had filed suit in a Milwaukee court against the Allis-Chalmers Mfg. Co. in an effort to stop the manufacture of war munitions in this country, these two questions have agitated the iron, steel and machinery trade.

With hundreds of concerns manufacturing shells and other forms of ammunition, with vast factories crowded with orders for small arms, rifles and artillery, with the automobile industry focused on the production of military vehicles and the machine tool builders working double shifts to fill the demands of the hour, there is little wonder that a minor action in a Wisconsin court suddenly assumed national importance and that the personality, antecedents and motives of Samuel Pearson became a matter of grave concern in the metal trades.

The conviction is growing that a searchlight should be turned on Mr. Pearson and everything connected with him and his attack on a reputable American concern. Anticipating this demand for information, *The Iron Trade Review* has made an exhaustive investigation of the whole affair, the results of which it is now proposed to set forth.

Summary of the Case

Before going into details it would be well to summarize the principal features of the case as it now stands. A complaint was filed in the circuit court of the state of Wisconsin in Milwaukee, on April 30, under the so-called discovery statute to secure information to determine whether the Allis-Chalmers Mfg. Co., a corporation, Otto Falk, its president and others, have entered into an "immoral conspiracy" with the Bethlehem Steel Co. and others not yet known, to manufacture and ship shrapnel shells to European belligerents contrary to the Wisconsin law.

The complaint was filed by Samuel Pearson, who declares he is a citizen of the United States, that he has valuable property interests located within the boundaries of the German Empire, and that he is owner of securities issued by the German government. In his complaint Pearson averred that the defendants, prior to the war, were engaged in the manufacture of peaceful instruments of modern industry and that the manufacture of shrapnel was engaged in only after the war started and is to continue only during the actual duration of the war. The complaint sets forth that it is believed the defendants have entered into an unlawful conspiracy with the Bethlehem Steel Co. and others and that such a conspiracy is a criminal offense under the laws of Wisconsin.

SAMUEL PEARSON
He Arrived only Recently From Germany, But Claims American Citizenship

The proposed examination under the discovery statute is for the purpose of ascertaining, among other things, the names of each person or corporation with whom the defendants may have contracted for the manufacture of shrapnel shells or similar munitions; the intent and nature of such contracts and the names of any consignees to whom such munitions may have been shipped. Upon the information gained in this examination, it is said an injunction suit will be based to prevent the defendants from continuing in any such conspiracy as is alleged.

The preliminary hearing was set for May 5, but on May 4 the Allis-Chalmers Mfg. Co., secured an order from W. J. Turner, judge of the circuit court, commanding Samuel Pearson to show cause on May 18 why proceedings under the discovery statute for examination of Otto Falk before Court Commissioner Kanneberg should not be perpetually stayed and the suit dismissed. Lengthy statements have been issued and published by both sides and the attorneys for the plaintiff, Cochems & Wolfe, have asserted that the action will be fought to a finish.

If Pearson is the representative of any large forces there is no doubt that the case will become historic, and if it is bitterly contested its effect on the machinery industry may be far reaching.

Pearson's Own Story

The question now arises, who is Pearson, and has he any official standing?

Pearson told his story to a representative of *The Iron Trade Review*. He says he is a native of South Africa, a Boer, and that he was an officer in the Boer army during the South African war. He says that the highest command he held was acting quartermaster-general. He further claims that he came to the United States before the close of the South African war in the interest of the Boers and that when he tried to return home at the conclusion of hostilities, passports were denied him. He says he has been exiled from his native country by England ever since.

Court records indicate that Pearson was in the United States prior to the termination of the Boer war and that this is not his first attempt to prevent the shipment of war supplies from the United States to a belligerent country. During the South African affair he instituted a suit in New Orleans to prevent the shipment of mules to the British forces. He obtained a temporary injunction which, however, was very soon thrown out of court.

Pearson entertains a cordial hatred for England and everything English and intimates that he is one of the faction of Boers who are still working for South African independence. He asserts that the triumph of Germany would

result in the re-establishment of the Transvaal republic and that, therefore, he is willing to do everything he can to aid the cause of the Germanic allies. To this end he has started the suit against the Allis-Chalmers company, entirely and absolutely on his own behalf, he asserts. He says, also, that it is his duty as a neutral American citizen to try and prevent the exportation of murderous instruments of warfare.

He exhibited passports and papers which tended to prove that he is a naturalized American and he says that his home is in Scranton, Pa. He claims that he was in Germany at the outbreak of the war and that he remained until about six weeks ago when he came to this country. He says he has property in Germany, including an interest in the Continental Pressputz Gesellschaft of Frankfort-Am-Main, Germany, a corporation organized to manufacture wall decorations out of cement.

Not Very Well Informed

So much for Pearson's story. As for the man himself, he is past 50, stocky, robust, energetic, with an intense disposition and a ready tongue. He appears clear headed and balanced, but at the same time somewhat affected and superficial. For a man who claims such a vital interest in the manufacture of war munitions in the United States, his knowledge of the general features of this business, of the contracts that have been placed, the concerns involved, and the industries affected is, apparently, decidedly sketchy and incomplete. Although traveling about as a private citizen of the United States, Pearson wears a uniform which is German in style and color but carries no insignia of rank.

From information which has been received regarding Pearson from a great many different sources, since he filed his suit, it is evident that his career in this country has been, to put it mildly, checkered and unconventional. There are references to financial transactions in Scranton of a peculiar character and alleged incidents in the "general's" life in South Africa which would indicate that his inability to return to that quarter of the globe might not depend entirely on the pleasure of the British government. Also, in this connection, it is interesting to observe that although there is no doubt of the genuineness of Pearson's hatred of the English, at the same time his name is purely English and there is nothing in his voice, accent or manner suggestive of the Boer or the Dutch.

In his complaint against the Allis-Chalmers Mfg. Co. Pearson takes pains to refer to the neutrality of the United States. He draws particular attention to President Wilson's original neutrality proclamation in the following language: "* * * * And said chief executive has further appealed to the American people to refrain in public places and in private conversation from such expressions of partisanship and partiality between said parties as might create friction, disorder and bitterness."

Neutrality in Practice

Let us contrast these high sounding asseverations regarding neutrality with some of Pearson's own words on the lecture platform since he returned to the United States from Germany. In the *Milwaukee Journal* of April 27, he is reported as follows:

"Italy will never enter the war on the side of the Allies. If she did she would get just what the Allies are getting now and she realizes this. The Dardanelles cannot be forced by sea and I do not think any land force that can be brought to bear by the Allies will be successful. The German submarines are busy today laying mines. I think that before summer is far advanced they will get some of the American liners which are carrying munitions of war to England. Russia will be the first to sue for peace and this will happen just as soon as they get another licking from von Hindenburg. The retreat of General von Kluck was not necessarily a victory for the Allies. It was a withdrawal movement, a part of a plan of strategy which the Germans developed early in the war."

In view of these remarks, some people might be led to assert that "General" Pearson would better practice neutrality before he preaches it.

Has Pearson any official backing? It is generally believed that he has not. Of course no one can tell just at this time whom Pearson represents, but the theory which seems to be most plausible is that the financial sinews for the Allis-Chalmers suit have been furnished, largely, by a few of the more radical Germans in Milwaukee who, perhaps, are connected directly, or indirectly, with the radical German-American Alliance which has been outspoken in its opinions regarding exportations of war munitions from this country. It can be definitely asserted that Pearson has no connection with the conservative German-American element in Milwaukee, represented by the Wisconsin Neutrality League, of which A. J. Lindemann, president of Lindemann & Hooverson Co., stove manufacturer, is chairman.

There is no doubt, however, that Pearson would welcome official aid from Germany and it is positively known that he has directed communications to Count J. H. von Bernstorff, ambassador from Germany, suggesting that the embassy counsel be sent to Milwaukee to help fight the case, also requesting that he be furnished funds through the medium of a third party.

Baron von Schoen, secretary of the embassy, when interviewed in Washington Friday by a representative of *The Iron Trade Review*, stated that as yet no such communication had been received from Pearson. He said that naturally the German embassy is watching the case with interest but that it has positively no official connection with it.

"Mr. Pearson has not yet asked that the embassy counsel be sent to Milwaukee," said Baron von Schoen, "counsel will not be sent by the embassy and no request, so far, has been made by Mr. Pearson for money from the embassy, through a third party or otherwise." To add to this positive statement, the baron said counsel would not be sent by the embassy even though it had been requested and money would not be provided through any source. Baron von Schoen doubted if the embassy would have any right to interfere in the case which is purely an American affair so far as the court proceedings are concerned, "Anyhow," he stated, "it is a state case and we direct our attention only to government cases which are taken up with the state department." The baron was told plainly that seemingly reliable reports have it that the embassy is supporting Mr. Pearson and is taking an active interest in the suit, although of an unofficial nature. His sweeping denial was taken to mean that there has either been a wrong interpretation of the status of the case, or the embassy felt it was expedient not to illuminate its actual position, or it has been dragged into the case unofficially, for the influence it may be thought it will have.

Not Making Shells

Having now classified Mr. Pearson pretty accurately as a gentleman adventurer and soldier of fortune, let us turn our attention to the details of the contract between the Allis-Chalmers Mfg. Co. and the Bethlehem Steel Co. and investigate the legal basis for the suit. The Allis-Chalmers company is turning shrapnel forgings which are furnished it by the Bethlehem company. All that the Milwaukee concern does is to finish-turn the rough forgings, fit on the copper gas ring and provide the brass nose ring into which the timing device is screwed. When the shells are shipped from the West Allis plant they are in an exceedingly unfinished condition. The Bethlehem Steel Co. has made every effort to shroud the ultimate destination of these shells in secrecy and there is no doubt that none of the officials of the

Allis-Chalmers company is aware of where the completed shells finally go. The contract will extend for about two years and is positively without privilege of cancellation. Its fulfillment is not conditioned in any way upon the duration of the war. This is the only war contract the Milwaukee company has made. The Allis-Chalmers Mfg. Co., therefore, is not making shrapnel as is alleged in the Pearson complaint. It is only doing a small part of the work connected with making a completed shell and is exporting nothing, its relations being entirely of a domestic character, with the Bethlehem Steel Co.

There is a law in Wisconsin making a conspiracy for immoral purposes punishable and in order to maintain his suit Pearson must prove that a contract to manufacture and sell war munitions is an immoral act, tantamount to "accessory before the fact of murder." Some of the difficulties which must be surmounted before this allegation can be proved in court can be readily imagined. Before he can start his main suit, however, Pearson must have certain information in regard to the relations between the Allis-Chalmers Mfg. Co., and the Bethlehem Steel Co., and to this end he has invoked the discovery statute of Wisconsin. This law, which is peculiar to Wisconsin, has been in force for a number of years. Simmons, in his Wisconsin Law Digest, Vol. I, page 1068, says that, "an order for discovery is a provisional remedy in an action taking the place of an auxiliary suit in equity for that purpose." Simmons also states that, "under present circuit court rules, a plaintiff who applies for an order to compel discovery of documents under the control of the defendant which may be necessary to enable such petitioner to frame his complaint, must show by his affidavit, not only that he is advised by his counsel and verily believes, that they are necessary for that purpose, *but must also state facts and circumstances from which the court can see that such necessity really exists.*"

This is the point that will be argued at the hearing on May 18 and unless Pearson is able to show that it is necessary for the preservation of his interests that he be given the information he seeks regarding the relations of the Allis-Chalmers Mfg. Co. with the Bethlehem Steel Co., the case can go no further.

By reason of the legal difficulties involved, and the novel contentions advanced by the plaintiff, it is not believed that the iron, steel and machinery industry need be specially alarmed by this action. At the present writing it appears entirely improbable that Samuel Pearson and the persons who are backing him will be able in any way to affect the fulfillment of the contract between the Allis-Chalmers Mfg. Co. and the Bethlehem Steel Co., and it is very doubtful if any legal cause for prohibiting the manufacture and shipment of war materials can be discovered.

Official Program

Of Atlantic City Meeting of Machine Tool Builders

The official program of the thirteenth semi-annual convention of the National Machine Tool Builders' Association, to be held May 20 and 21, at the Marlborough-Blenheim hotel, Atlantic City, promises one of the most interesting meetings ever held by the association. The complete program is as follows:

THURSDAY, MAY 20.

Morning Session.

9:00 *to* 9:30 *O'clock.*

Registration of members.
Roll call.
Reading of minutes.
Report of membership committee, J. H. Drury, chairman.
Announcement of auditing, resolutions and press committees.
Call for resolutions.
Reports of officers and committees.

10:45 *O'clock.*

Address "The Application and Use of Time Study Data," Robert I. Kent, editor, *Industrial Engineering*, New York City.

12:00 *O'clock.*

Address, "How to Profitably Operate a Night Force," Harold C. White, superintendent of assembling, Pierce-Arrow Motor Car Co., Buffalo.
Discussion.

Afternoon Session.

2:00 *O'clock.*

Lathe committee.

2:30 *O'clock.*

Sensitive drilling machine committee.
Boring machine committee.
Gear cutting machine committee.
Grinding machine committee.

4:00 *O'clock.*

Hand screw machine committee.
Planing machine committee.
Other committees on call.

FRIDAY, MAY 21.

Morning Session.

9:00 *O'clock.*

Multi-spindle drilling machine committee.
Milling machine committee.

10:00 *O'clock.*

Shaping machine committee.
Vertical drilling machine committee.

11:00 *O'clock.*

Turret lathe committee.
Radial drilling machine committee.
Other committees on call.

Afternoon Session.

2:00 *O'clock.*

Address, "Drop Forgings," A. M. Tilton, president, Drop Forging Co. of New York, Jersey City, N. J.

3:00 *O'clock.*

Address, "Neutrality," George Grafton Wilson, professor of international law, Harvard University.
Executive session.
Adjournment.

Ore on Dock May 1

Tonnage Shows Only a Slight Increase Over Last Year—Distribution at Docks

Statistics gathered by *The Marine Review* from the various dock managers at Lake Erie ports show that the amount of ore on Lake Erie docks on May 1 was 6,092,303 gross tons, against 5,920,157 tons in 1914, an increase of 172,146 tons.

The total rail shipments from Lake Erie ports to furnaces during the winter season (Dec. 1 to May 1) aggregate 2,315,602 tons, as follows:

	Tons.
On dock Lake Erie ports, Dec. 1, 1914	8,407,905
On dock May 1, 1915	6,092,303
By rail to furnaces, winter of 1914-15	2,315,602

Adding these winter shipments to 22,914,887 tons, the amount shipped to furnaces during the navigation season of 1914, gives 25,230,489 tons as the entire consumption of ore from Lake Erie ports during the year ended May 1, 1915, against 39,089,319 tons for the year ending May 1, 1914; 37,437,269 tons for the year ending May 1, 1913; 26,428,799 tons for the year ending May 1, 1912; 36,636,692 tons for the year ending May 1, 1911; 33,599,913 tons for the year ending May 1, 1910; 20,524,523 tons for the year ending May 1, 1909; 31,692,446 tons for the year ending May 1, 1908; 30,099,769 tons for the year ending May 1, 1907; 28,984,356 tons for the year ending May 1, 1906; 20,057,070 tons for the year ending May 1, 1905; 18,739,995 tons for the year ending May 1, 1904; 21,905,251 tons for the year ending May 1, 1903; 17,216,065 tons for the year ending May 1, 1902; 14,465,260 tons for the year ending May 1, 1901, and 15,882,881 tons for the year ending May 1, 1900.

The following table gives the amount of ore on dock on the dates given:

Port.	May 1, 1915.	Dec. 1, 1914.
Buffalo	178,152	234,880
Erie	412,186	484,467
Conneaut	564,077	1,160,639
Ashtabula	1,963,233	2,749,315
Fairport	283,591	406,124
Cleveland	1,592,783	1,757,543
Lorain	377,550	548,097
Huron	462,917	483,769
Sandusky	2,471	2,471
Toledo	255,343	580,600
Total	6,092,303	8,407,905

Out of a total movement of 503,832 gross tons of ore during April, 136,224 tons went to Lake Erie ports, distributed as follows:

Port.	Gross Tons.
Buffalo	10,662
Erie	.....
Conneaut	31,599
Ashtabula	36,665
Fairport	11,066
Cleveland	37,654
Lorain	.....
Huron	8,578
Toledo	.....
Total	136,224

Prominent Steel Men Lost

In the Sinking of the Lusitania—The Cargo of the Ill-Fated Ship

New York, May 11. — Several men holding positions of prominence in lines of manufacture associated with the iron and steel industry plunged to their death Friday afternoon, May 7, when the Cunard steamship, Lusitania, was torpedoed by a German submarine off the coast of Ireland. Those who are numbered among the probable victims of the heartrending disaster were Albert L. Hopkins, president of the Newport News Shipbuilding & Dry Dock Co., Newport News, Va.; Wm. S. Hodges, foreign representative of the Baldwin Locomotive Works, and Chas. A. Plamondon, president of the Plomondon Mfg. Co., Chicago machinery builders. Others who escaped with their lives after thrilling experiences were Samuel L. Knox, Germantown, Pa., president of the New York Shipbuilding Co., Camden, N. J.; C. T. Jeffrey, of Kenosha, Wis., manufacturer of automobiles, and Fred J. Gauntlett, Washington representative of the Newport News Shipbuilding & Dry Dock Co., who was accompanying Mr. Hopkins.

William S. Hodges, who had represented the Baldwin Locomotive Works in various foreign countries, was another one of those who lost his life in the sinking of the steamship Lusitania. Mr. Hodges had been affiliated with the Baldwin works for 15 years and had represented his company successively in China, Russia and France. He had come to this country recently to take to Paris his family who had remained behind in Philadelphia. It is feared his wife and one child who accompanied him, also perished in the disaster. Another child was rescued.

The Lusitania's Cargo

Considerable comment has been made upon the amount of ammunition, iron and steel and other contraband articles which the Lusitania carried. The manifest of the boat showed that these included: 4,200 cartridge and ammunition cases, three machine pattern packages, six machinery packages, one electric machinery package, four electric material packages and four packages of auto vehicles and parts for London; four steel manufactures packages for Bristol, eight packages of steel manufactures, 138 packages of copper manufactures, 33 packages of iron manufactures, 144 packages of aluminum manufactures, 95 packages of brass manufactures, 16 packages of wire goods, 1,271 ammunition cases, two machinery packages, eight electrical material packages, five packages of auto vehicles and parts, 31 hardware packages, 63 cutlery packages, 58,465 pounds of copper wire, 111,762 pounds of ingot copper and 260,000 pounds of sheet brass for Liverpool; two packages of engines and material for Dublin and 20 packages of sewing machines and parts for Manchester. The total value of the freight cargo was $735,579, which included principally sheet brass of the value of $50,000, copper and copper wire of $32,000, copper manufactures of $21,000 and ammunition of $200,000.

ALBERT LLOYD HOPKINS

Death of A. L. Hopkins

Albert Lloyd Hopkins, president of the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., was among those lost on the ill-fated Lusitania. Mr. Hopkins was born Sept. 7, 1871, at Glens Falls, N. Y., and in 1892 he graduated from the Rensselaer Polytechnic institute. After a few months' work in an architect's office in Chicago, he was appointed to a position in the bureau of construction and repair, navy department, Washington, D. C. In 1894 he went to Newport News as a member of the staff of Naval Constructor J. J. Woodward, U. S. N. In the summer of 1897, Mr. Hopkins was transferred from Naval Constructor Woodward's office and assigned to the graduate school of naval architecture at the U. S. naval academy, Annapolis, Md. At the outbreak of the Spanish-American war, Mr. Hopkins was assigned to the naval station at Key West, Fla., in charge of all of the construction and repair work done for the fleet at that station. While engaged in this work Mr. Hopkins received from the late W. A. Post, then superintendent of the Newport News ship yard, an offer to return to Newport News, and in August, 1898, he was appointed assistant to Mr. Post. In 1905 Mr. Hopkins was appointed assistant general manager and in 1911, when Mr. Post succeeded to the presidency, Mr. Hopkins was made manager. Upon the death of Mr. Post, in February, 1912, Mr. Hopkins was elected vice president and became the chief executive officer of the company, with headquarters in New York. In March, 1914, Mr. Hopkins succeeded to the presidency of the company. He was a member of the American Society of Civil Engineers, the American Society of Naval Engineers, the Society of Naval Architects and Marine Engineers and the American Academy of Political and Social Science. He is survived by his widow and one daughter.

Institute Program

Valuable Papers on Practical Subjects to be Presented at Annual Meeting

Formal announcement of the program to be presented at the eighth general meeting of the American Iron & Steel Intsitute at the Waldorf-Astoria, New York, Friday, May 28, has been announced. As noted previously, an effort this year has been made to reduce the number of formal papers and to encourage the presentation of an informal discussion on the respective subjects. The formal program is as follows:

Address by the president, Elbert H. Gary.

"Waste Heat Boilers," by Charles J. Bacon, steam engineer, Illinois Steel Co., South Chicago.

"The Commercial Production of Sound and Homogeneous Steel," by Edward F. Kenney, metallurgical engineer, Cambria Steel Co., Johnstown, Pa.

"Blast Furnace Advancement," by Andrew E. Maccoun, superintendent, Edgar Thomson blast furnaces, Carnegie Steel Co., Braddock, Penn.

"Merchant Rolling Mills," by Jerome R. George, chief engineer, Morgan Construction Co., Worcester, Mass.

"Recent Progress in Corrosion Resistance," by Daniel M. Buck, metallurgical engineer, American Sheet & Tin Plate Co., Pittsburgh.

At the banquet in the evening the principal paper will be on "Welfare Work of the Tennessee Coal, Iron & Railroad Co."

D. S. Woods, formerly Philadelphia salesman for Niles-Bement-Pond Co., Inc., has been transferred to New York.

THE OPEN HEARTH

More Light on Regulation

MANY men who have attained wealth, or a high position, or both, forget the man of small means who occupies a relatively humble position in the world.

Man of large affairs too often regard public questions from their own viewpoint and in the light of their own experience. T. W. Robinson, first vice president of the Illinois Steel Co., who delivered an address recently before the Youngstown, O., Chamber of Commerce, as reported in *The Iron Trade Review* last week, is not that kind of a man.

Mr. Robinson told his audience that business is in a slough of industrial despond today on account of uncertainty and fear. He said, there is general timidity on the part of small investors, who are our true capitalists. "Any blow at the prosperity of incorporated capital," said Mr. Robinson, "strikes the small man infinitely harder than it does the large man." This seems almost commonplace and self-evident, but it is just such plain facts that are forgotten or ignored. It is well to remember always that when capital in general suffers, the small investor suffers most severely.

Mr. Robinson traced the history of our present commercial troubles, telling how small corporations gave way to large ones and they, in turn, to centralization of industry; of how abuses crept in, and of how regulation was inaugurated and continued. He said it would be folly for business to try to deny the abuses, or on the other hand to attempt to justify some of the economic doctrines upon which regulation has been attempted, or to excuse the ignorance, if not vindictiveness, with which some of the regulation has been undertaken. The speaker told how the Sherman law has been construed, first, to prohibit all combinations which directly restrain competition, next, according to the "rule of reason," later, in the International Harvester Co. case, by a district court to order dissolution, on account of too large a percentage of a special business being acquired, and recently, in the Keystone Watch Co. case, by a district court which refuses to dissolve the company, on the ground that size is not a crime.

Mr. Robinson referred to the uncertainty and confusion caused by the various decisions and to the disastrous effects of tariff laws not based on scientific investigation. He advocated a permanent non-partisan tariff commission and urged the co-operation of business interests to bring about the passage of a just tariff law.

In conclusion, Mr. Robinson urged that business organizations more thoroughly co-operate in turning the limelight of publicity upon business legislation and regulation. He expressed the belief that business organizations could unite in each state and form a small non-partisan centralized body for promoting publicity in respect to the men, doctrines and methods involved in state legislation affecting business.

There no longer is any question about the desirabilty of publicity in regard to business affairs, and more light is needed in just the directions pointed out by Mr. Robinson. Some associations of business men are rendering excellent service in keeping their members informed as to what their servants, public officials, are doing, but there is urgent need of still greater effort to keep constantly in touch with legislatures, commissions, bureaus and all sorts of organizations which affect in any way the business of the country.

Farrell's Warning

PRESIDENT James A. Farrell, of the United States Steel Corporation, in a recent address before the Academy of Political and Social Science, discussed at length Central and South American trade as affected by the European war and made some very interesting observations in regard to the finances connected with that trade. He said that while the establishment of dollar exchange will not perhaps entirely replace confidence in sterling bills at the conclusion of the war, a beginning has been made for American banking. Then he threw new light upon the depression which existed before the war. He said: "Although much is said in favor of conducting business

THE OPEN HEARTH

in accordance with the desires and standards of our Latin-American customers, we should remember that this applies only to what is recognized by the world to be sound business practice. Arguments in favor of granting six, nine and 12 months' credit do not recognize the fact that extension of unusual credits was an important factor in the industrial depression preceding the war, Germany's eagerness for British trade having led many German firms to extend credits which deferred merchants' obligations several months beyond the time when they realized on the purchased goods. With this ready money at hand, the merchant frequently speculated in land, with the result that collapse of the land boom caused heavy losses and failure to pay at maturity of even these long credits."

Buying From Foreigners

INTENSE Americanism, Americanism of the real, red-blooded kind, is not inconsistent with a cool head and common sense.

The Iron Trade Review stands first, last and all the time for intense Americanism, but that does not mean to advocate rashness in diplomacy or exclusiveness in commercial affairs. A prominent Chicago manufacturer who recently wrote a letter to *The Iron Trade Review* does not understand our position. He said:

> We do not see any reason why the government should not purchase its machinery from other nations under a strict interpretation of the specifications which it has put out, any more than why other nations should not purchase their machinery from us under the same conditions. For instance, as a practical illustration, this company furnished the British government in April of last year, two large specially designed cold metal saws. They were for the admiralty and were taken in competition with both British and German manufacturers; at the present time we are manufacturing another saw of the same design, also for the admiralty.

The writer of the letter added that he believed that if the government should take the position that it would not allow foreign manufacturers to compete on government orders, except in very rare cases, the policy would lead to the prohibition of all foreign trade between nations.

The Iron Trade Review believes that as a broad, general proposition American industry should have reasonable protection, so that American manufacturers will not be compelled to reduce wages in order to meet foreign competition. We believe in a revision of the tariff along protective lines, based on thorough investigation of all the facts relating to manufacturing at home and abroad. Under just conditions, foreign trade would be profitable to both buyer and seller and should be encouraged. Americans are willing to buy as well as sell on a fair basis.

In placing government business, particularly that which is related directly or indirectly to the possibility of war, a principle supplementary to that which enters into the general commercial affairs ought to be recognized. There may be rare cases in which, on account of patents being controlled by a foreign government, it is justifiable to place an order away from home. If, however, it is possible for the army or the navy to obtain in this country, at reasonable prices, munitions of war or any kind of machinery that might be connected with war, there ought to be no question about the order being placed in this country. The reason for this policy is perfectly clear. If, for example, the United States had failed to encourage the manufacture of munitions of war, as it did when it encouraged Mr. Carnegie to go into the manufacture of armor plate, and had purchased all such material from Germany, England and other foreign countries, what a pitiable aspect this country would present at the present time!

We are for peace, if it can be maintained with honor. We earnestly hope that it will be possible to maintain peace with honor, but there is great satisfaction in feeling that on account of the wise policy that has prevailed in this country, not persistently and consistently, —especially during the past two years—but in most of the acts and policies of national administrations of the 40 years prior to 1913, this country is now in such a position that it need not tamely submit to all insults that foreign nations may heap upon it.

Prices Present and Past

Quotations on leading products May 12, average for April, 1915, average for February, 1915, and average for May, 1914. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices May 12, 1915.	Average for Apr., 1915.	Average for Feb., 1915.	Aver. for May, 1914.
Bessemer pig iron, Pittsburgh..	$14.55	$14.55	$14.63	$14.90
Basic pig iron, Pittsburgh.....	13.60	13.45	13.45	13.90
No. 2 Fdy. pig iron, Pittsburgh	13.45	13.45	13.70	14.09
Northern No. 2 Fdy., Chgo....	13.00	13.00	13.00	14.25
Lake Superior Charcoal, Chgo..	15.75	15.75	15.75	15.75
Malleable, Bessemer, Chgo.....	13.00	13.00	13.00	14.25
Southern No. 2, Birmingham...	9.75	9.50	9.50	10.50
Southern Ohio No. 2, Ironton.	12.50	12.75	12.75	13.50
Basic, eastern Pa.....	13.25	13.25	13.50	14.00
No. 2X Virginia furnace.....	12.50	12.50	12.50	12.75
No. 2X foundry, Philadelphia..	14.25	14.25	14.25	14.75
Ferro mang., Balt., (prompt)..	100.00	100.00	68.00*	38.00
Billets, Pbgh.	19.00	19.60	19.50	20.00
Sheet bars, Pbgh.....	20.00	19.60	20.00	21.00
Steel bars, Chicago.....	1.39	1.38	1.31	1.29
Steel bars, Pittsburgh.....	1.20	1.20	1.10	1.15
Iron bars, Philadelphia.....	1.17	1.125	1.12	1.22
Iron bars, Cleveland, local del'y	1.20	1.20	1.15	1.25
Iron bars, Chgo. mill.....	1.15	1.15	1.15	1.10

*Nominal.

	Prices May 12, 1915.	Average for Apr., 1915.	Average for Feb., 1915.	Aver. for May, 1914.
Beams, Chicago	$1.34	$1.36	$1.31	$1.29
Beams, Pittsburgh	1.20	1.154	1.10	1.15
Beams, Philadelphia	1.359	1.30	1.25	1.26
Tank plates, Pittsburgh.....	1.20	1.11	1.10	1.125
Tank plates, Chicago.....	1.29	1.28	1.27	1.29
Tank plates, Philadelphia.....	1.359	1.30	1.25	1.25
Sheets, blk., No. 28, Pittsburgh	1.80	1.80	1.80	1.87
Sheets, blue an., No. 10, Pbgh.	1.35	1.30	1.30	1.37
Sheets, galv., No. 28, Pbgh...	3.40	3.30	3.01	2.80
Wire nails, Pittsburgh.....	1.55	1.59	1.55	1.57
Connellsville fur. coke contr...	1.65	1.65	1.65	2.00
Connellsville fdy. coke, contr...	2.25	2.25	2.25	2.50
Heavy melting steel, Pbgh....	11.75	11.90	11.55	12.00
Heavy melting steel, east'n Pa.	11.25	11.25	10.50	10.75
Heavy melting steel, Chgo.....	9.25	9.30	9.44	9.94
No. 1 wrought eastern Pa.....	12.50	12.50	12.00	12.50
No. 1 wrought, Chgo.....	8.75	8.55	8.88	8.63
Rerolling rails, Chgo.....	10.00	9.85	9.62	11.25
Car wheels, Chgo.....	9.75	9.80	10.00	11.38

(For Additional Prices See Page 992.)

Central West Wants Large Tonnage

Scattering Inquiries in the Chicago District Aggregate 30,000 Tons—Eastern Stocks Decline—Warrants to be Revived

Chicago, May 11.—Activity continues in the Chicago pig iron market with increasing inquiry and continual sales of practically all grades of iron. One seller estimates present inquiry about 30,000 tons, most of which apparently is earnest and will result in contracts. This consists of foundry iron for the most part with more malleable than has been the case for some time and some specialties also are included. Sales are being made continually, mostly for last half delivery, with some to fill immediate needs.

Contracting is being done on the basis of $13, Chicago furnace, for No. 2 foundry and malleable, with unusually strict adherence to silicon analysis.

Among present inquiries may be noted one from a central Illinois malleable foundry for 1,800 tons, of which 1,300 tons were closed on Tuesday at $13, Chicago furnace, and the remainder probably will be contracted at once. A central Indiana malleable foundry is asking for 1,000 tons and a car equipment concern for an equal quantity of malleable iron. One inquiry for 5,000 tons of foundry is also pending for a melter in Chicago.

Southern iron apparently is on a basis of $9.75 to $10, Birmingham, for immediate delivery and nothing under $10, Birmingham, for last half. The effect of the higher quotation on southern iron has been to stiffen prices on northern iron and competition has shown that southern sellers are adhering strongly to their published quotations.

Basic Purchased

Cleveland, May 11.—If there has been any change in the pig iron situation in northern Ohio recently it is for the better. Shipments are going forward to the foundries promptly and it is believed that contracts will be completely filled on their expiration. The Central Steel Co., Massillon, O., has purchased upwards of 1,000 tons of basic from a central Ohio furnace in order to commence operations. This concern, however, has not yet fully covered its requirements.

Malleable Iron Active

Cincinnati, May 10.—Malleable iron is more active. One lot of 4,000 tons and another of 2,000 tons have been sold in central Ohio for last half shipment, and a melter in the same territory is inquiring for 1,500 tons of the same grade. Inquiry for southern foundry iron is light, as a lull generally follows an advance in quotations, and southern No. 2 foundry is now strongly held at from $9.75 to $10, Birmingham basis, which is from 25 to 50 cents a ton above prices of two weeks ago. Southern Ohio iron is displaying a little weakness, and one producer has reduced quotations to $12.50, Ironton basis, for No. 2 foundry, for immediate delivery. Other makers are holding at $12.75, Ironton basis, for any delivery through the last half. The best feature of the market is that consumption is increasing, and some furnaces are not only shipping out their entire products each month, but are also making deliveries from stocks in yards.

Basic Advances 15 Cents

Pittsburgh, May 11.—After a period of activity, during which approximately 100,000 tons of pig iron were sold, the market is comparatively quiet, but there is a slight tendency toward higher prices. Basic iron has advanced to $12.65, valley, at which figure one lot of 15,000 tons and another of 4,000 tons for third quarter delivery were sold last week. Some dealers are asking $12.75, valley, for this grade. Bessemer shows no snap. No. 2 foundry is quotable at a spread from $12.50 to

(*For complete prices see page* 992.)

$12.75, valley; malleable and gray forge grades show no change.

Buffalo Market Quiet

Buffalo, May 11.—The largest inquiry appearing in the Buffalo market is for 3,000 tons of foundry grades for a New England melter. Aside from this, the market shows very little life, with the exception of a light inquiry for small lots, embracing principally special grades of the higher silicon irons for filling in. The activity in charcoal irons continues, however.

Bookings Much Exceed Shipments

Philadelphia, May 10.—A heavy increase in orders over shipments was netted in April by the merchant furnaces enrolled in the Eastern Pig Iron Association. This was due in a considerable measure to the heavy purchase of basic by the Lukens Iron & Steel Co. in that period. Stocks also shared a considerable increase, but this is explained largely by the fact that there was an expansion by more than this increase, of iron made for the market by the furnaces during the month. Stocks of merchant furnaces in eastern Pennsylvania still are comparatively small. No furnaces were added to the active list in April, but one of the Crane furnaces will probably resume soon. The market has been quiet the past week and orders have run usually in small amounts. Pipe makers have been buying some further lots. One consumer of this class in this territory took 1,000 tons of eastern Pennsylvania forge at $13.25, delivered. A Bristol, Pa., pipe shop still figures on 6,000 tons for the next several months. A Waynesboro, Pa., buyer asks 500 tons of foundry. Foundry iron prices remain at $14 to $14.25, Philadelphia, for No. 2X, with sales going 25 to 50 cents higher in instances. Most Virginia makers still will accept $12.50 furnace for No. 2X though the leading producer there is refusing to shade $13, furnace. In steel making grades the 3,000 lot of basic for a Phoenixville buyer has not been closed. Some question has been raised regarding a 4,000-ton inquiry for Bessemer, reported a week ago and the Philadelphia consumer referred to as being in the market is denying that it intends to purchase such iron. Low phosphorus iron sales have been light.

Southern Iron Firm

Birmingham, Ala., May 10.—Little iron for the last half is now being offered in the Birmingham district for less than $10, for No. 2 foundry. Business is not as good as it was last month, but inquiry is fairly brisk and the market has lost none of its optimism.

Furnace operators state they do not expect to do as large business this month as in April. Two furnaces in the district are to be blown in. Blast furnace No. 1 of the Tennesse Coal, Iron & Railroad Co., was blown in at Ensley a couple of days ago after being idle several months. The Philadelphia furnace of the Sloss-Sheffield Steel & Iron Co., at Florence, is to be blown in about May 15. The improvement in the iron market and the rapid reduction of stocks are said to be the cause of the resumption of operations.

Southern Iron Stronger

St. Louis, May 10.—Pig iron prices are firmer, most sales agents asking $10 for Southern No. 2. Inquiries and sales are confined to car lots.

Eastern Market Quiet

New York, May 11.—Trading in pig iron in this territory has been less active the past week than during the several weeks preceding. This condition was apparent before the Lusitania disaster, so that it cannot be ascribed in any measure to the disturbing influence upon sentiment of the latter. A fair run of small orders has continued, but inquiries of size have been exceptional. A railway equipment builder who inquired recently for about 1,000 tons of malleable for a Michigan plant, has increased the amount asked to 2,000 to 3,000 tons of malleable and foundry. Some doubt, however, is expressed whether it will buy at this time. Prices show little deviation from recent levels and remain at $14.25 to $14.50, tidewater, for No. 2X, or $13.50 to $13.75, eastern Pennsylvania furnace. Buffalo iron is little talked about in this territory recently and seems firm at previous prices. New England prices remain at $15 to $15.50, delivered, for No. 2X. Export business in pig iron has been less active. A new sale of 2,000 tons of southern to Italy was made in the week with full domestic prices reported. Another lot of 1,000 tons is about to be closed. Freight rates continue on a high plane. From the south, they now are about 35s to Italy and 30s to the British Isles.

The Wright Machine Co., Inc., Owensboro, Ky., capital $150,000, commenced business May 1. This company succeeds the Gunther-Wright Machine Co., and will manufacture gas engines, also excavating machines and wet dredge machines, equipped with both steam and oil engines. John S. Wright, president.

(For complete prices see page 992.)

Ore Rate Reduced June 1

Cleveland, May 11.—The Mesabi range railroads have announced that the 55-cent rate ordered by the interstate commerce commission will be made effective voluntarily on June 1. The commission directed that the rate be reduced on June 15. This will result in materially increased lake shipments during June. On the other hand, as much Mesabi ore as possible will be held back for shipment until the new rate takes effect. Although no official announcement has been made, undoubtedly the new Vermillion and Cuyuna range rates will also be made effective June 1. It now is conceded that the full benefit of the reduced Minnesota range freight rate will be given to the purchaser. Buying of iron ore by independent interests proceeds very slowly and no new developments are reported.

Large Tonnage Eastern Ore Sold

Philadelphia, May 11.—Some tentative inquiries as to what prices might be quoted on transatlantic iron ore, have been made of sellers by eastern Pennsylvania furnaces. It is believed that these inquiries have been put out chiefly for purposes of comparing transatlantic and lake ore prices and that they are not likely to result in sales. Sellers state that transatlantic ore practically is out of the question under present conditions, but they have suggested about 8¼ cents per unit, tidewater, as the probable quotation. Some sales of local New York and New Jersey ores to eastern furnaces continue. One block of 25,000 tons of New Jersey magnetites was taken by an eastern consumer within the range of 6½ to 7 cents per unit, delivered. A cargo of Wabana, Newfoundland, ore has been offered in the market.

April Ore Movement

Ore shipments during April were 503,832 tons as against 269,686 tons for April, 1914, an increase of 234,146 tons. It is expected now that the May movement will be quite fair. Shippers in general have lined up considerable business for their own fleets and outside vessels may get cargoes before the month is over. Following were the shipments by ports during April:

Port.	April 1914.	April 1915.
Escanaba	110,729	49,307
Marquette	.....	4,438
Ashland	40,838	43,949
Superior	62,338	87,175
Duluth	.....	174,989
Two Harbors	55,781	143,974
Total	269,686	503,832

1915 increase, 234,146.

Implement Trade Buys Bars

Some Contracts Have Been Placed for Last Half on Basis of 1.20c, Pittsburgh

New York, May 11.—Formal inquiries now have been issued to the mills and bids are to be taken in a few days by the American Locomotive Co. for the steel for its one-half portion of the large shell order recently taken for the British government. The inquiries now placed before the mills by the American Locomotive Co. call for 27,000 tons of 3½-inch rounds, for shipment in comparatively small amounts during the next two months and in larger equal tonnages monthly up to May, 1916. Shipment is to be made both to Richmond and to Dunkirk. It is expected probably this order will be distributed next week. The New York Air Brake Co., which received a quarter of the total contract for shells by the British government, also is in the market for its requirements, amounting to 12,000 to 15,000 tons of steel bars. The Westinghouse Air Brake Co., which received the remaining one-fourth of the business, is expected to buy its bars at Pittsburgh. Other negotiations for shrapnel bars, are now in the market. In the regular channels of trade, new business keeps up about as recently and specifications are moving freely. In reinforcing bars, producers are interested in a large requirement for the erection of additions to the plant of the Colgate Co., at Jersey City. Steel bar prices are steady at 1.369c, New York, or 1.20c, Pittsburgh, for second quarter delivery.

Asks Bars For Shells

Philadelphia, May 10.—Inquiries are being put out by the local locomotive works for a large tonnage of steel rounds which are said to be for an order for shells which the company has taken from the European belligerents. Steel bar makers have done little as yet in covering implement manufacturers in this territory with their last half requirements of bars at the recently advanced price of 1.20c, Pittsburgh, but a few small contracts of this kind have been closed. In the case of the smaller farming implement and machinery manufacturers in eastern Pennsylvania, their contracts have been negotiated at 1.20c, Pittsburgh, for third and 1.25c, Pittsburgh, for fourth quarter. Miscellaneous new business in steel bars is moderate, and specifications are about up to expected volume in this district. Prices are holding firm at 1.369c, Philadelphia, or 1.20c, Pittsburgh.

Bar Makers Break Records

Pittsburgh, May 11.—It develops that some of the larger manufacturers of steel bars in this district last month broke records for the last two years from a standpoint of shipments. Steel bars are firmly maintained at 1.20c for second and at 1.25c for third quarter. As previously reported, material is offered agricultural implement makers at 1.20c for last half delivery. Other rather heavy purchasers, who are being quoted 1.25c for third quarter shipment, have complained considerably about the concession offered the agricultural implement trade. The Carnegie Steel Co., now operating on an 80 per cent basis, is driving bar mills practically at capacity. Iron bars are quoted at 1.25c by most makers in this district.

Implement Makers Buy

Cleveland, May 11.—Some fair bar contracts have been made recently with agricultural implement makers, who usually obtain concessions, at 1.20c, Pittsburgh, for the remainder of the year. On the ordinary run of business, prices are well maintained on a basis of 1.25c, Pittsburgh, for third quarter and 1.30c for fourth quarter. Specifications are more liberal and the tonnage under negotiation is increasing. A fair tonnage of bars will be required for a new warehouse to be erected in Cleveland by the Fisher Bros. Co.

Steel Bars Firm

Chicago, May 11. — Firmness characterizes the market for soft steel bars. Negotiations are becoming active between agricultural implement makers and steel bar makers, the principal point at issue being whether contracts will be made for six months from July 1 or for a year from that date. Steel makers are maintaining firmly their stand that no contracts will be made beyond Jan. 1 and consumers are endeavoring to break down this attitude.

Some contracts have been made with small agricultural implement makers for their requirements for last half, on a basis of 1.39c, Chicago mill, and it is expected larger makers will be covered on contracts on the same basis within the next 30 days. This discussion of the length of contract is making the market rather slower than usual but a large tonnage is expected as soon as this has been tested sufficiently to bring it to a conclusion.

To other users than agricultural implement makers, bars for last half are quoted at 1.44c, Chicago mill, and for immediate delivery at 1.39c, Chicago. Comparatively no new business is being contracted at present and specifications against existing contracts are being received at a gratifying degree.

Buying for Last Half

Buffalo, May 11.—Mills and agencies report an increasing interest on the part of consumers in prices for bar material, as well as the other finished lines, for third quarter and last half requirements. Some of the selling interests display a reluctance to quote on third quarter and last half needs, although several leading interests have opened their books for material under contract for third quarter at 1.25c, base and some tonnage has also been placed for last quarter at 1.30c, base.

Bar Iron Sluggish

Chicago, May 11.—No change has taken place in the situation as to bar iron, demand remains small and quotations steady at 1.15c, Chicago mill, with mill operation not in excess of 50 per cent.

Hoops, Bands and Shafting

Pittsburgh, May 11. — Cold rolled shafting is quoted at 68 per cent off for future delivery, but some makers are offering material at 69 and 70 per cent off for spot delivery. Demand is rather heavy and most shafting makers are operating plants at maximum capacity. Hoops and bands are quoted at 1.30c and 1.20c, respectively, although the 1.25c figure for hoops has not disappeared entirely.

Nuts, Bolts, Rivets

Pittsburgh, May 11. — Several rivet makers are benefiting from recent orders placed for foreign shipment, but details of sales are not announced. Specifications for nuts, bolts and rivets are fairly heavy and prices are described as firm. Most plants are in need of additional tonnages.

Negotiations have been concluded for the sale of the Cleveland Clutch Co. to the Reliance Gauge & Column Co., 5902 Carnegie avenue, Cleveland, O. The latter concern recently completed a 5-story building and is fully prepared to handle the clutch and pulley business formerly conducted by the Cleveland Clutch Co.

(For complete prices see page 992.)

Black Sheets Are Firm

Galvanized Again Advanced—Tin Mills Operate at 95 Per Cent of Capacity

Pittsburgh, May 11.—Galvanized steel sheets have reflected strength the last week or 10 days. So far as can be ascertained, there has been no deviation from the 3.40c quotation for No. 28 gage, the price asked by the American Sheet & Tin Plate Co. Manufacturers whose supplies of spelter are low are quoting base size as high as 3.75c and some sellers have withdrawn from the market entirely. Makers of sheets for automobiles are enjoying rather heavy demand and the general market shows more snap than previously. Blue annealed products have strengthened and quotations below 1.35c for No. 10 gage are infrequent. The American Sheet & Tin Plate Co. is operating sheet mills at about 70 per cent of capacity.

Pennsy Places Car Sheets

Philadelphia, May 10. — The recent order for 2,500 tons of No. 12 gage sheets for the Pennsylvania railroad for box car construction at Altoona has been closed and is reported to have gone to the leading maker. Sheet volume with eastern Pennsylvania mills continues more lively and specifications are being received liberally. Middle western buyers have been ordering more freely against contracts with eastern mills. A break in the water rate of 45 cents per 100 pounds on sheets between the Atlantic and Pacific coasts appears at hand owing to the lower trans-continental rail rate about to be announced. Already one of the steamship lines has reduced to 40 cents. Pacific coast buyers still hold off awaiting the new rail rate. Sheet prices remain on the basis of 1.459c to 1.509c, Philadelphia, or 1.30c to 1.35c, Pittsburgh, for No. 10 gage blue annealed.

Black Sheets Stronger

Cleveland, May 11.—Black sheets seem to have stiffened a trifle and 1.80c, Pittsburgh, for No. 28 appears to be about the bottom. Inquiry is fair. The galvanized situation is dominated by the conditions surrounding the spelter market and the future is uncertain. In some quarters it is expected that spelter will go higher than copper and the galvanized trade, therefore, is on a hand-to-mouth basis.

Advance Expected

Cincinnati, May 11. — Galvanized sheets are unchanged at from 3.50c to 3.60c, Pittsburgh basis, and indications point to another advance in the next few days, especially for future delivery. Mills will not sell for shipment beyond June, because of the uncertainty in the price of spelter. Sales of black sheets are good, and prices are unchanged at from 1.80c to 1.85c, Pittsburgh.

Sheets Still Blocked

Chicago, May 11.—The situation in the steel sheet market remains unchanged. The leading independent maker of galvanized sheets in Chicago continues to remain out of the market and will not take business at any price except in case of an established customer being badly in need and will make no quotation under 4.19c, Chicago mill. Black sheets continue at former levels and No. 28 gage may be obtained at 1.89c to 1.94c, Chicago mill.

A peculiar situation manifests itself in the galvanized sheet market in that sheets have been obtained from warehouses at lower prices than from the mills which sell to warehouses. It is predicted that stocks are not sufficient to carry warehousemen into third quarter and as soon as present contracts expire an abrupt rise in price will be necessary. Some predictions are that prices will go $10 to $15 per ton above present levels after midyear if the situation in spelter continues as at present.

Eastern mills continue quoting 3.60c, Pittsburgh, on No. 28 gage galvanized while a few are seeking to obtain 3.75c, Pittsburgh, on this product.

Large Car Orders Pending

Strengthen Plate Market, Although Prices for Early Delivery Are Below Third Quarter Quotations

Pittsburgh, May 11.—With inquiries involving more than 30,000 cars, makers of plates and shapes and other car material soon expect to enjoy increased activity. Pending orders for cars include about 15,000 for the Pennsylvania railroad which recently added 1,000 automobile cars to the list for the Lines West; the Rock Island, 5,000; the Chicago, Milwaukee & St. Paul, 2,000 box cars aside from 2,000 ordered from its own shops; the International & Great Northern, 1,000 cars; the Minneapolis & St. Louis, 1,000; the Missouri, Kansas & Texas, 1,000; the Chicago & North-Western, 1,000 and possibly 2,000 in addition to 2,000 recently purchased; the Western Maryland, 1,000. Steel plates are firmly held at 1.20c by more important makers. One seller is reported to be shading that figure $1 a ton and another interest recently offered material at 1.10c for immediate acceptance. It generally is believed, however, that the 1.20c figure for second quarter soon will be firmly established in all sections of the country.

Plate Tonnage Still Gains.

Philadelphia, May 10.—Plate tonnage remains at quite satisfactory volume with eastern Pennsylvania mills and has shown a further slight expansion with some makers during the week. Operations in instances hold up to 80 to 85 per cent. A good tonnage continues to originate with the shipyards and there is a lively demand from the boiler shops for plates for marine boilers arising out of recent vessel contracts placed. No further awards were made to eastern shipyards during the past week, but a number of unclosed propositions are in the market. It now is reported that the Pennsylvania railroad did not place as large a tonnage of plates and other steel as it recently required, for cars to be built at Altoona, and that the Cambria Steel Co., which received all the plates, took 10,000 tons. The Pennsylvania railroad has specified with eastern mills for the plates for 15 of the locomotives to be built at Altoona. A shipbuilder in the district is expected to furnish the pontoons requiring about 3,000 tons of plates, for the government for the Norfolk navy yard, the cranes for which recently were awarded to the Wellman-Seaver-Morgan Co. There are more preliminary inquiries for material for locomotive construction. On the price side, there is no evidence of sharp irregularity and 1.20c, Pittsburgh, or 1.39c, Philadelphia, for prompt and second quarter appears the market.

Large Plate Tonnage Required

New York, May 11.—A requirement of 5,500 to 6,000 tons of plates is included in the section of the Culver elevated railroad line in Brooklyn, bids on the construction of which will go in May 18. The appearance of new inquiries for cars from domestic

(For complete prices see page 992.)

roads and the promise of some large tonnages of plates being needed for foreign rolling stock orders, is a source of considerable satisfaction to platemakers, as it has been this class of buying that has been lacking. Miscellaneous orders for plates continue better. Prices are holding quite well at 1.369c, New York, or 1.20c, Pittsburgh, for prompt and second quarter.

Plates Weak

Cleveland, May 11.—In contrast to shapes and bars, plates are showing some weakness, and it is believed that 1.20c, Pittsburgh, can be done for third quarter shipment. For early delivery, 1.15c, Pittsburgh, is still available in the Cleveland district.

Plates Continue Weak

Chicago, May 11. — Steel plates are obtainable in the Chicago market at 1.29c, Chicago mill. Weakness in this product results from mills being hungry for tonnage, even larger producers not having sufficient orders to keep their operations up to a profitable point.

Shipbuilding demands in the east have given more strength to the plate market there than has been apparent further west. Some tank business has come out recently, the Santa Fe railroad placing orders for oil tanks which will require 2,700 tons of plates, with the Kennicott Co. in Chicago. Plates for this work will be rolled by a local independent.

Coke Market Quiet

Prices Are Being Well Maintained—Production Declines Slightly

Pittsburgh, May 11.—Sales of 72-hour coke have been fairly heavy the last fortnight. One of the larger operators has been an aggressive seller for shipment after July 1. This particular interest will close books May 15. Foundry coke for prompt shipment is quoted at a spread from $2 to $2.40, ovens, and contract fuel is selling at a range from $2.25 to $2.50, ovens. The market for furnace coke is comparatively quiet. One consumer has closed for 10,000 tons of 48-hour fuel a month for last half, but details of this transaction are not announced. The *Connellsville Courier*, for the week ending May 1, says production was 292,891 tons, a decrease of 6,602 tons compared with the week before.

Foundries Buy Coke

Cincinnati, May 11.—Foundry coke is more active, melters in this territory showing a tendency to buy for future delivery. Tennessee furnaces have purchased approximately 50,000 tons of Wise County furnace coke for the last half. Prices are unchanged in all southern fields.

Coke Quiet

St. Louis, May 10.—Coke is in better demand than last week, but the inquiries are limited. Connellsville and Virginia foundry grades are quoted at $2.50, ovens.

Ferro-Manganese

Guarantee Distribution Clause Revised—Large Shipments Reach Philadelphia

New York, May 11.—In response to protests from various American consumers, the British Admiralty has revised the objectionable No. 4 clause of the formal guarantee required to be given by users of English ferro-manganese before shipments of this alloy are distributed. This clause originally provided that the consumer receiving the ferro-manganese "will not sell to any person in the United States any steel in the manufacture of which the said ferro-manganese has been employed without obtaining from him a written undertaking that the same is not to be re-exported from the United States and satisfying ourselves that he will carry out such an undertaking." A number of leading buyers of ferro-manganese had refused to sign the pledge because of this clause which it was contended was practically impossible of strict observance. Requests were made to the British government that this section be amended so as not to hold the steel works responsible for the ultimate destination of finished steel passing through many hands and this now has been complied with.

The largest single shipment of ferro-manganese, about 3,000 tons, since the lifting of the embargo, reached Philadelphia today on the Appenine from Middlesbrough. The arrival of this boat brought the week's delivery to about 3,500 tons. The Larchmore, at Baltimore, brought in several hundred tons and the Asian is about to come in at New Orleans. Other shipments are en route.

Some English producers of ferro-manganese, apparently, are inclined to sell conservatively at the advanced price of $88, seaboard, to consumers other than those who now are under contract with them. They are willing to "marry" old contracts with equal tonnages at the $88 price, but sellers have been advised that on matters other than these propositions should be submitted to the producers for final acceptance. Consequently, practically no new sales at the higher price are reported by direct agents.

Recent shipments from England have relieved the situation of its acuteness for a number of consumers, but others still remain in the position where they are considerably concerned over their early needs. Where buyers are in urgent need of material, they still are paying $100, delivered, for prompt delivery and sales of one or two carloads by an eastern Pennsylvania producer at this figure, are noted. There has been more demand the past week, for small lots of lump and ground ferro-manganese, for which prices of 6 to 7 cents per unit at the grinding plant have been obtained, depending upon the amount of the order.

A Philadelphia steelmaker, who inquired recently for 300 tons of 11 to 12 per cent bessemer ferro-silicon, distributed more than this tonnage among several makers at about $19.50, delivered, or $16, Ohio furnace. There is some inquiry in the market for 50 per cent ferro-silicon, including one lot of 100 tons.

Alloys Moderately Stronger

Pittsburgh, May 11.—Lower grades of ferro-silicon are commanding about 50 cents a ton above previously prevailing prices. Fairly heavy inquiry for all grades is reported. Spot ferro-manganese is quotable at about $95 a ton at the eastern seaboard and dealers are asking $88 a ton for future delivery. The freight rate on ferro-manganese from Pitt, Cal., to New York City, has been reduced from 75 cents to 55 cents a ton, effective June 15. The rate to Pittsburgh remains unchanged at 75 cents. The reduction will benefit California makers of ferro-manganese, all of whom use electric furnaces. The reduction in rates failed to cause any stir among eastern sellers of this material. Vanadium is being quoted at $2.25 a pound, but that figure has been shaded in a number of instances recently. Ferro molybdenum and ferro-tungsten are in fairly good demand. Spiegel is quoted at $25, furnace.

Tin Plate Buying Light

Pittsburgh, May 11.—New buying of tin plate is light, but decidedly low quotations are being offered by some mills. Some tonnage, it is understood, has been offered at $3.10, base. Tin plate mills are running at maximum capacities.

Boiler Tubes

Cleveland, May 11.—The advance of $2 a ton in boiler tubes has had no apparent effect on the market in the Cleveland district. Inquiry is irregular and on the whole remains considerably below normal.

(*For complete prices see page* 992.)

Large Contracts for Shapes

Baldwin Locomotive Co. Closes for 8,000 Tons for Plant Extension—Scattering Orders Heavy

New York, May 11.—War business still is furnishing the requirement of some good lots of structural steel for plant extensions. A new contract just let calls for 8,000 tons for the enlargement of the Eddystone, Pa., plant of the Baldwin Locomotive Works. This extension is to be completed in 10 weeks, as the company has taken a large shell order for a foreign government. Despite the extraordinary quick delivery demanded in the various contracts for war plant construction, recently placed in the east, some of these are understood to have developed prices which have been almost record-breaking in their lowness. Such severe price cutting, however, has not applied to work in this city for there has been a slight improvement recently in the figures at which fabricated orders have been taken. Railroad business has shown up a little more prominently in the week, the awards and inquiries of this kind totaling about 5,000 tons. The total volume of the market shows no material change, but the long list of small orders is maintained. Producers appear to be quoting uniformly 1.369c, New York, or 1.20c, Pittsburgh, on current business on shapes.

Many Small Orders Appear

Philadelphia, May 10.—Marked by the greatly increased number of small orders or those ranging from 30 to 100 tons each, the structural steel situation in this territory offers continued cause for encouragement to the mills, despite the absence of larger awards. Not a few of these small orders represent work which has been held back for some time, but now is being released. The large number of these small awards is the principal feature of the market in this district. Eastern shape mills continue to operate at better schedules and are keeping prices more strictly to 1.359c, Philadelphia, or 1.20c, Pittsburgh. This is illustrated by the placing in the week of 100 tons of channels at the full price after the buyer had shopped thoroughly for a lower figure.

Shapes Strong at 1.20c

Pittsburgh, May 11.—Structural shapes are firmly pegged at 1.20c for second quarter and material has been sold at 1.25c for third quarter delivery. What has been said with reference to future activity of the market for steel plates, applies to the market for structural shapes. Fabricating shops are in need of tonnage, but prospects appear to be good.

Better Demand for Structural

Buffalo, May 11.—Mills and fabricators of the Buffalo district report a noticeable improvement in the demand for structural material. For the most part the business appearing is for limited tonnages, but there are several undertakings being figured that will require upwards of 500 tons.

Fair Bookings

Cleveland, May 11.—A fair amount of business has been booked recently at 1.25c for third quarter. Many concerns having war contracts are figuring on the structural requirements for extensions to their plants. For immediate delivery, the shape market remains at 1.20c, Pittsburgh.

Shape Demand Better

Chicago, May 11.—Demand for structural shapes in the west proved better during the last week and three projects of unusually large tonnage were closed. Business in small shipments of a carload or slightly more continues to roll up a fair aggregate but cessation of construction work in Chicago, due to the building trades' strike, continues to put a damper on strictly local business.

Prices on structural shapes continue to be slightly weaker than for bars and they may be obtained at 1.34c to 1.39c, Chicago mill.

CONTRACTS AWARDED.

Lehigh Valley Terminal, Buffalo, sub-contract for structural, to Lackawanna Bridge Co., Buffalo, 1,500 tons.

Ford Motor Co.'s service building and branch assembling plant, Buffalo, contract to Turner Construction Co., Buffalo, 300 tons reinforcing bars.

American Bridge Co. has taken 130 tons for a fire service station at Toledo, O., and 160 tons for a high school at Fostoria, O.

The Grasselli Chemical Co., Cleveland, has awarded a contract for a new building at New Castle, Pa.; 100 tons.

A., T. & S. F. Ry. Co., oil tanks, 2,700 tons, to Kennicott Co., Chicago.

Carnegie Library, San Francisco, Cal., 2,000 tons, to Pacific Rolling Mill Co.

C., B. & Q. R. R. Co., various bridges, 1,353 tons, to Fort Pitt Bridge Co.

Frick, Stearns & Russel Co. building, Cedar Rapids, Ia., 356 tons, to Gage Structural Steel Co., Chicago.

City of Oakland, Cal., department of public works, wharf shed, Oakland, Cal., 250 tons, to Dyer Bros., San Francisco.

Service bridge over Mahoning river connecting by-product coke oven plant with blast furnace plant of Youngstown Sheet & Tube Co., Youngstown, 600 tons, awarded McClintic-Marshall Co. Foot bridge, 100 tons, awarded Pittsburgh-Des Moines Steel Co.

Bridge for Boston & Maine railroad near Greenfield, Mass., 1,200 tons, American Bridge Co.

Terminal for Lehigh Valley railroad at Buffalo, 1,500 tons, Lackawanna Bridge Co.

Paper mill building at Remford Falls, Me., 200 tons, American Bridge Co.

Loft building, Boston, 500 tons, New England Structural Co.

School building, Brooklyn, 500 tons, Lackawanna Bridge Co.

Extensions to the plant of the Hickok Mfg. Co., Harrisburg, Pa., 300 to 400 tons, Pennsylvania Steel Co.

Store building for Bowman Bros., Harrisburg, Pa., 125 tons, Pennsylvania Steel Co., Harrisburg, Pa.

Extensions to the plant of the Baldwin Locomotive Works, Eddystone, Pa., 8,000 tons, McClintic-Marshall Co.

CONTRACTS PENDING.

Radley printing building, West Twenty-eighth street, New York City, 1,500 tons or more; bids being taken.

Elimination grade crossings for Lehigh Valley railroad, Buffalo, 400 tons; bids being taken.

Bridge work for Virginian railroad, 200 tons; bids being taken.

Courthouse at Fairfield, Conn., 250 tons; bids being taken.

Lambs Club, Forty-fourth street, New York City, revised plans issued, reducing steel requirements to 350 tons.

High school, Worcester, Mass., 500 tons; bids being taken.

Grandstand for Westside Tennis Club, Forest Hills, N. Y., 200 tons; bids taken.

Loft building for Burton Bros., at Twenty-ninth street and Broadway, New York City, 1,200 tons; plans about to be issued.

Bulkhead shed for Hudson Navigation Co. at Albany, N. Y., 400 tons; bids recently taken.

Column cores for loft building, 253-255 Broad street, Philadelphia, 150 tons; bids being taken.

Column cores for building for Victor Talking Machine Co., Camden, N. J., 100 tons; bids being taken.

Additional bridge work for Pennsylvania railroad increasing the amount now in the market to about 2,000 tons.

Warehouse, reinforced concrete with steel beams, for The Fisher Bros. Co., Cleveland, 200 tons; bids being taken.

Mall theater building, Cleveland, 60 tons.

(For complete prices see page 992.)

Pipe Advance

Is Being Maintained, But Buying is Somewhat Restricted

Pittsburgh, May 11.—Frequent reports are heard that steel oil country goods have been advanced, but such rumors are denied by the National Tube Co. All makers of wrought steel and iron pipe now are quoting products at advanced figures, announced May 1. Demand for merchant pipe is almost normal and scattering orders for oil country material are being placed. Boiler tubes are quiet and show signs of irregularity in some sections.

George H. Jones, vice president of the Inland Steel Co., has gone to California for a stay of a month.

Railroads Glut Market

Lists of All Kinds of Scrap at Chicago Total 20,000 Tons and St. Louis Offerings Heavy

Chicago, May 11.—A flood of railroad scrap offerings totaling over 20,000 tons, coming after considerable offerings in preceding weeks, has laid a heavy burden on the scrap market in Chicago. Buying remains slight and apparently little is being done by consumers, although some dealers are taking on tonnages for speculative purposes. A few specialties have shown slight increase but for the most part quotations remain stationary.

Railroad offerings include 7,600 tons from the Illinois Central in which appear 1,000 tons each of No. 1 railroad wrought, No. 1 steel rails and car wheels; Southern Railway offers 4,200 tons; Chicago Milwaukee & St. Paul, 2,200 tons; Northern Pacific, 2,000 tons; Chicago Great Western, 1,400 tons; Soo Line, Toledo, St. Louis & Western, Chicago, Peoria & St. Louis and Belt Railway of Chicago offer 700 tons each.

Heavy Railroad Offerings

St. Louis, May 10.—The scrap market appears to be much firmer and while there have been no advances of consequence, the tendency is toward better conditions. Consumers still have large tonnages of material on hand, but are willing to take additional scrap if the price is attractive. Railroad offerings for the week are: Cincinnati, Cleveland, Chicago and St. Louis, 4,000 tons, of which 1,500 tons are for long steel rails; Chicago, St. Paul, Minneapolis & Omaha, 650 tons; Mobile & Ohio, 1,250 tons; Kansas City Southern, 200 tons; St. Louis & San Francisco, 230 tons; Toledo, St. Louis & Western, 100 tons.

Sales are Light

Cincinnati, May 11.—Rolling mills are again showing some activity in the purchase of iron and steel scrap, but they are still taking very small lots in comparison with what dealers had hoped they would buy. No. 1 machine cast is in heaviest demand, at from $8.50 to $9 per net ton. Railroads are offering large lists, but dealers are not adding much to stocks, as these are already heavy. Foundries are buying sparingly and from hand to mouth. Prices are unchanged on all grades of old materials.

Upson Nut Embargo Continues

Cleveland, May 12.—While for the moment scrap prices are being held fairly steady, from the standpoint of mill buying the market is almost as dull as it was last autumn. The rolling mills are out of the market, and the embargo on shipments to the Upson Nut Co. continues in force. Some scrap is being shipped to valley mills; this is an important factor in the maintenance of prices in Cleveland, and is growing more so every year. Much old material is being offered on the market, and dealers look for weakness to develop within the next few days.

Melters Figuring Scrap Needs

Pittsburgh, May 11.—Several of the more prominent consumers of heavy melting steel are tentatively negotiating for material, and it is understood rather attractive prices are being offered. While dealers have been selling heavy melting steel at about $11.75, it is known that above $12.25 was offered for some of the material held by the Pennsylvania railroad. Sales this week have not involved heavy tonnages and no change in prices is noted.

Scrap More Active

Buffalo, May 11.—Heavy melting steel, turnings, borings and bundled sheet scrap are the active commodities in the Buffalo scrap market. They are going forward in good volume. There is a disposition on the part of the dealers to sell larger tonnages for deliveries over the next 30 days to two months, on the apparent supposition that no great changes in prices will occur within that time. Cast scrap remains weak.

Export Scrap in Demand

Philadelphia, May 10.—Italian buyers who in recent months closed for 15,000 to 20,000 tons of ingot and rail crops with eastern steel makers again are in the market for 5,000 tons of rail crops. Some other export business in scrap is moving in this district as a dealer sold a trial lot of 150 tons of steel axles for shipment to the British Isles at around $25, delivered, or at the equivalent of the full domestic prices of $14 to $14.50, eastern Pennsylvania. The market in eastern Pennsylvania still is moving irregularly and is only moderately active. Wrought pipe has shown a better demand with sales of 1,000 to 2,000 tons to an eastern Pennsylvania consumer at $10.75, delivered, or 25 cents higher. This price still is being offered. Some sales of No. 1 railroad wrought at $13, delivered, are reported. Heavy milling steel in new sales of some hundred tons to one buyer in the week brought $11.50, delivered, which seems about the market. Heavy cast is easier, but certain buyers will pay $12.50, delivered.

Light Buying in East

New York, May 11.—Light buying of old material in this territory has continued, and the market is moving along quietly in a practically even position. Some new buying of wrought pipe and heavy melting steel in eastern Pennsylvania the past week have brought out offers of around $8.25, New York, for pipe, and $9 for steel. Pittsburgh has been rather indifferent to efforts of eastern dealers to sell steel but has made offers of $12, delivered. Car wheels appear stronger in that some dealers will pay $9.50, New York, for eastern Pennsylvania delivery. Shafting is strong and $16, eastern Pennsylvania, has been offered by consumers. Steel axles also are higher. About 1,000 tons of wrought and cast scrap is being marketed through the demolishing of the government assay and American Bank Note Co. buildings in this city.

(*For complete prices see page* 992.)

Foreign Orders

Help Wire Market, Although Domestic Trade Seasonably Declines

Pittsburgh, May 11.—Wire mills continue to operate at practically maximum capacity, largely as a result of specifications against contract for export. Shipments of barb wire and nails to belligerent European nations are heavy and scattering orders are being placed by the allies for future delivery. The domestic trade shows no snap and were it not for the abnormal foreign demand, wire mills would be operating at greatly reduced schedules. Material is quotable on the basis of $1.55 a keg for nails. The 60 cent extra for galvanizing is being strictly adhered to and there probably will be no deviation from that price until after spelter quotations decline.

Operating 90 Per Cent

Cleveland, May 11. — The leading interest continues to operate its mills at about 90 per cent of capacity and is fully occupied in most departments. It is reported that an increase on the prevailing extra for galvanized wire is under consideration.

Specifications Satisfactory

Buffalo, May 11.—Specifications continue in good volume on wire for the manufacturing trade. Sales and inquiries, however, are reported light. Prices are being firmly maintained.

MEN OF THE IRON TRADE

Who they are Where they are What they are doing

Alfred Place has been appointed chief electrician of the Youngstown Sheet & Tube Co., Youngstown, to succeed Owen R. Jones, who now is identified with the Youngstown Iron & Steel Co., that city.

Wm. S. Gintz, for a number of years affiliated with the Erie Malleable Iron Co., Erie, Pa., has been appointed foreman of the foundry operated by the American Malleable Iron Works, Lancaster, N. Y.

William M. Mehlhorn, who has been general superintendent of the steel plant of the Eastern Steel Co., at Pottsville, Pa., has been made a director and vice president of the company in charge of manufacturing.

Alex. T. Drysdale, formerly affiliated with the Sheffield Pipe & Foundry Co., Sheffield, Ala., has accepted a position with the United States Cast Iron Pipe & Foundry Co. and will be located at the Burlington, N. J., plant.

F. K. Irvin, formerly with the New York, New Haven & Hartford railroad, has become connected with the Chicago office of the Niles-Bement-Pond Co., Inc., and will look after the railroad machine tool demand in that territory.

W. L. Clark, formerly vice president of Niles-Bement-Pond Co., Inc., and for the past few months connected with the purchasing department of J. P. Morgan & Co., New York, has severed this connection to go with the Westinghouse Electric & Mfg. Co.

H. E. Preston, formerly with the American Can Co. and the Felt & Tarrant Mfg. Co., Chicago, is now associated with the Gisholt Machine Co., Madison, Wis., at its Chicago office, 208 South La Salle street. He will have charge of the company's Periodograph interests in that territory.

A. H. Hall, formerly Chicago sales manager for the Hendey Machine Co., Torrington, Conn., has been transferred to take charge of the New York office of that company. F. L. Peterson, formerly assistant to Mr. Hall, has been promoted to the position of manager of the Chicago office.

F. M. Saunders, of Saunders Bros. & Co., 149 Fenchurch street, London, is in this country looking after the purchases of steel products for shipments to the British Isles. Mr. Saunders' firm is the British representative of the Lackawanna Steel Co.

John D. Hagenbach, assistant to the president of the Bethlehem Steel Co., is in the John Hopkins hospital at Baltimore, recovering from a recent illness.

Fred A. Bigelow has been appointed general sales manager of the Carpenter Steel Co., Reading, Pa., succeeding John E. Sullivan, resigned. James W. Sederquist has been named western sales manager to succeed Mr. Bigelow, with office and branch warehouse at 400 Lakeside avenue N. W., Cleveland.

Hon. Albert E. Kemp, of Toronto, president of the Kemp Mfg. Co., and of the Sheet Metal Products Co. and minister without portfolio in the Canadian administration, has been appointed as one of three members of the purchasing commission, which will have charge of all future buying of war supplies.

Alexander Taylor has been promoted from assistant secretary to secretary of the Lake Superior Corporation, the Algoma Steel Corporation and subsidiary companies, succeeding Thomas Gibson, who recently became president of the Lake Superior Corporation. Mr. Taylor has also been made a director of the various companies.

Andrew Carnegie has given $1,200,000 for new buildings and $1,500,000 for additional endowment to the Carnegie Institute of Technology, Pittsburgh. Announcement of the donation was made at the Founder's Day celebration last week. Mr. Carnegie's aggregate donations to the institute and library are $27,000,000.

William A. Viall, of Brown & Sharpe Mfg. Co., Providence, R. I., addressed the New England Foundrymen's Association at its May meeting, held on May 12 at the Exchange Club, Milk and Batterymarch streets, Boston. The subject of Mr. Viall's address was "A Winter Trip to Holland." Mr. Viall just has returned from Europe.

H. A. Anderson, president of the Anderson Rolled Gear Co., Cleveland, has been nominated by a committee of the Franklin Institute to receive the John Scott medal. The award is made for Mr. Anderson's work in advancing methods of gear rolling, with particular reference to his development of a method of rolling double helical bevel gears for Ford automobiles. These gears are rolled within a limit of 0.001-inch.

F. D. Taggart is now roll foundry superintendent of the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa. He has been superintendent of the roll foundry of the Illinois Steel Co., at Joliet, Ill., for the past seven years, and had charge of the roll foundry of the United Engineering & Foundry Co., at Youngstown, before going to Joliet.

A. D. Hart was recently elected president of the Westinghouse club, composed of employes of the Westinghouse Electric & Mfg. Co., Pittsburgh, to succeed M. C. Turpin. Mr. Hart was graduated from the University of Pennsylvania in 1911 and became an apprentice in the electrical engineering branch of the Westinghouse company. Later, Mr. Hart was appointed assistant to Paul M. Lincoln, in the engineering department.

E. St. Elmo Lewis, vice president and general manager of the Art Metal Construction Co., Jamestown, N. Y., has been elected president of the board of commerce of that city. Mr. Lewis was very active in the campaign for members of the newly organized board of commerce, which now is a body of 840 members, a large membership for a city of 7,000 registered voters. Mr. Lewis formerly was a resident of Detroit and took an active part in the organization of the Detroit board of commerce.

Reports that several Pittsburgh Steel Co. representatives were on the ill-fated Lusitania are incorrect. Officers of the Carnegie Steel Co., the Jones & Laughlin Steel Co., the Pittsburgh Steel Co., Crucible Steel Co. of America, and the Westinghouse interests say they had no representatives on the vessel. Early reports of the disaster said Colonel Millard Hunsiker, a former official of the Carnegie company, had made reservations on the Lusitania. It develops that Colonel Hunsiker had planned to sail on that boat, but changed his plans. He is now on the Canopia, bound for Italy. Colonel Hunsiker, one of the original Carnegie partners, was at one time representative of the company at London. He is vice president of the Belgium Relief Commission.

Enormous Demand for Cars

Inquiries Have Been Made by Several Lines for Practically 30,000 Cars—Large War Orders

New York, May 11.—Large possibilities of business in railroad supplies for Russia which have been talked about for some months, and recently have shown renewed activity, now are developing into some important orders. The Cambria Steel Co. has closed a contract for that country for 20,000 5-foot gage freight car axles and it is reported a large order for car wheels estimated to run from 25,000 to 50,000, also has been placed with a manufacturer in this country. The Lackawanna Steel Co. has taken 30,000 tons of 65-pound rails and accessories which represents but a small portion of the total rail tonnage which it is reported will be required for that country. Nothing official yet has been announced regarding the large car order for Russia which the Pressed Steel Car Co. is negotiating, but the final arrangement of this matter may come at any time.

The Central of Argentine railroad, it is assured, will distribute 8,000 tons of rails to mills in this country but some details yet remain to be settled. The Norfolk & Western railroad has placed 1,000 tons of rails with the Cambria Steel Co. and some with other mills. The Pennsylvania railroad took bids at the close of last week on its 138,000-ton inquiry but no distribution has been made. A representative of this system has gone to Sault Ste. Marie to look over the plant equipment of the Algoma Steel Co. which is figuring on the order.

Car Inquiries Broaden

An encouraging development in the railroad situation has been the increased inquiry for cars by domestic lines and there has been some buying. The North-Western placed 2,000 box cars with the Western Steel Car Co. and has been considering 2,000 additional. The Lehigh Valley has placed 1,000 underframes with the Standard Steel Car Co. and the Virginian railroad 500 with the Greenville Car Co. The Rock Island has inquired for 5,000 box; the Pennsylvania lines west have added 1,000 automobile to their inquiry, increasing it to 7,900 and for the whole system to 15,443 freight cars; the Missouri, Kansas & Texas and the International & Great Northern now have made arrangements to buy 2,000 and 1,000 cars, respectively. The St. Paul will buy 2,000 box and the Western Maryland 1,000 coal cars. The Sulzberger & Sons Co. ask 300 refrigerators and the Norfolk & Western 24 passenger equipment. Bids on the large Pennsylvania car inquiry went in on Monday.

Locomotives also have shown more activity. The Cuban Central railroad has placed 12 additional with the American Locomotive Co. The Western Maryland is out for 15 and the Chicago & Great Western for five. The North-Western is figuring.

Tennessee Receives Rail Order

Birmingham, Ala., May 10.—Official announcement has been made by the Tennessee Coal, Iron & Railroad Co. of the receipt of an order for 6,000 tons of steel rails from the Atlantic Coast Line railroad. Operations at the Ensley rail mills of the company are satisfactory.

Cast Iron Pipe

New York, May 11.—Better prices for cast iron pipe now are being demonstrated in this territory by lettings just made. John Fox & Co., for the Donaldson Iron Works, took 800 tons, largely 8-inch, for the department of water supply, this city, at $22.84, delivered. On a Newark, N. J., letting, the Standard Cast Iron Pipe & Foundry Co. is low on 1,206 tons of 6 to 12's at $22.34, delivered; 1,310 tons of 36 at $21.34, and 65 tons of specials at $55; the United States Cast Iron Pipe & Foundry Co. on 1,505 tons of 16, 20 and 24's at $21.84, and R. D. Wood & Co. on 850 tons of high pressure pipe at $21.99, with some specials at $60. Some makers report that average quotations now are from $1.50 to $2 a ton below those prevailing six or eight weeks ago. Buyers who did not close on previous low offers of the shops again are coming in the market. The market volume is well maintained. Public lettings are fewer, but private buying is good. The 10,000 to 12,000-ton requirement of Philadelphia, which is a contractor's letting, is to be bid upon May 25. This includes 3,000 tons of 48's and other sizes down to 6-inch and specials. Another contractor's letting of 8 to 20's for the department of public works, this city, was opened in the week. Lexington, Mass., has taken bids on 700 tons of 8 to 20's. It proves that the American Cast Iron Pipe Co. took the recent order of 175 tons of 6 and 8's for Panama at $22.40, delivered Colon. A number of small export inquiries are appearing. Italy is a prospective buyer and Cuba and Porto Rico have been buying small lots more freely. South America still inquires. These foreign buyers usually ask very lenient financial terms and this question must be adjusted before there is a large volume of business with these countries.

(*For complete prices see page* 992.)

Unfilled Tonnage

Of Steel Corporation Shows Slight Decline in April

A loss in total orders of 93,505 tons, which was slightly greater than the 89,622-ton decrease in March, was the result of its April operations announced by the Steel Corporation on May 10. This decrease practically measures up to the expectations that had been entertained previously. The Steel Corporation in April was able to maintain a rate of operations of between 70 and 75 per cent of ingot capacity, which would indicate shipments of 33,000 to 35,000 tons daily. This would tend to show in view of the average loss of 3,600 tons per working day reported that new bookings in April ranged from 30,000 to 32,000 tons daily.

The changes in unfilled tonnage since Nov., 1912, have been as follows:

Date.	Total.	Change, tonnage.	Change, per cent.
Apr. 30, 1915....	4,162,244	93,505—	2.21—
Mar. 31, 1915....	4,255,749	89,622—	2.06—
Feb. 28, 1915....	4,345,371	96,800+	2.28+
Jan. 31, 1915....	4,248,571	411,928+	10.74+
Dec. 31, 1914....	3,836,643	512,051+	15.40+
Nov. 30, 1914....	3,324,592	136,505—	3.94—
Oct. 31, 1914....	3,461,097	326,570—	8.62—
Sep. 30, 1914....	3,787,667	425,664—	10.01—
Aug. 31, 1914....	4,213,331	54,742+	1.32+
July 31, 1914....	4,158,589	125,732	3.12+
June 30, 1914....	4,032,857	34,697+	0.86+
May 31, 1914....	3,998,160	278,908—	6.98—
Apr. 30, 1914....	4,277,068	376,757—	8.09—
Mar. 31, 1914....	4,653,825	372,615—	7.42—
Feb. 28, 1914....	5,026,440	412,760+	8.95+
Jan. 31, 1914....	4,613,680	331,572+	7.74+
Dec. 31, 1913....	4,282,108	114,239—	2.59—
Nov. 30, 1913....	4,396,347	117,420—	2.60—
Oct. 31, 1913....	4,513,767	490,018—	9.79—
Sep. 30, 1913....	5,003,785	219,683—	4.24—
Aug. 31, 1913....	5,223,468	175,888—	3.03—
July 31, 1913....	5,399,356	407,965—	7.03—
June 30, 1913....	5,807,317	517,005—	8.18—
May 31, 1913....	6,324,322	654,440—	9.38—
Apr. 30, 1913....	6,978,762	490,194—	6.55—
Mar. 31, 1913....	7,468,956	187,758—	2.45—
Feb. 28, 1913....	7,656,714	170,654—	2.18—
Jan. 31, 1913....	7,827,368	104,796—	1.32—
Dec. 31, 1912....	7,932,164	79,281+	1.01+
Nov. 30, 1912....	7,852,883	258,502+	3.40+

Will Start Steel Plant

The steel plant of the International High Speed Steel Co., Rockaway, N. J., now is nearing completion and it is expected that it will be in full operation by the latter part of June. The product will be confined to the highest qualities of tool steels, alloy steels, high speed steels of all shapes and sizes, solid octagon and cruciform and hollow hexagon and round rock drill steels.

A Tremendous Loss to the Tax Payer

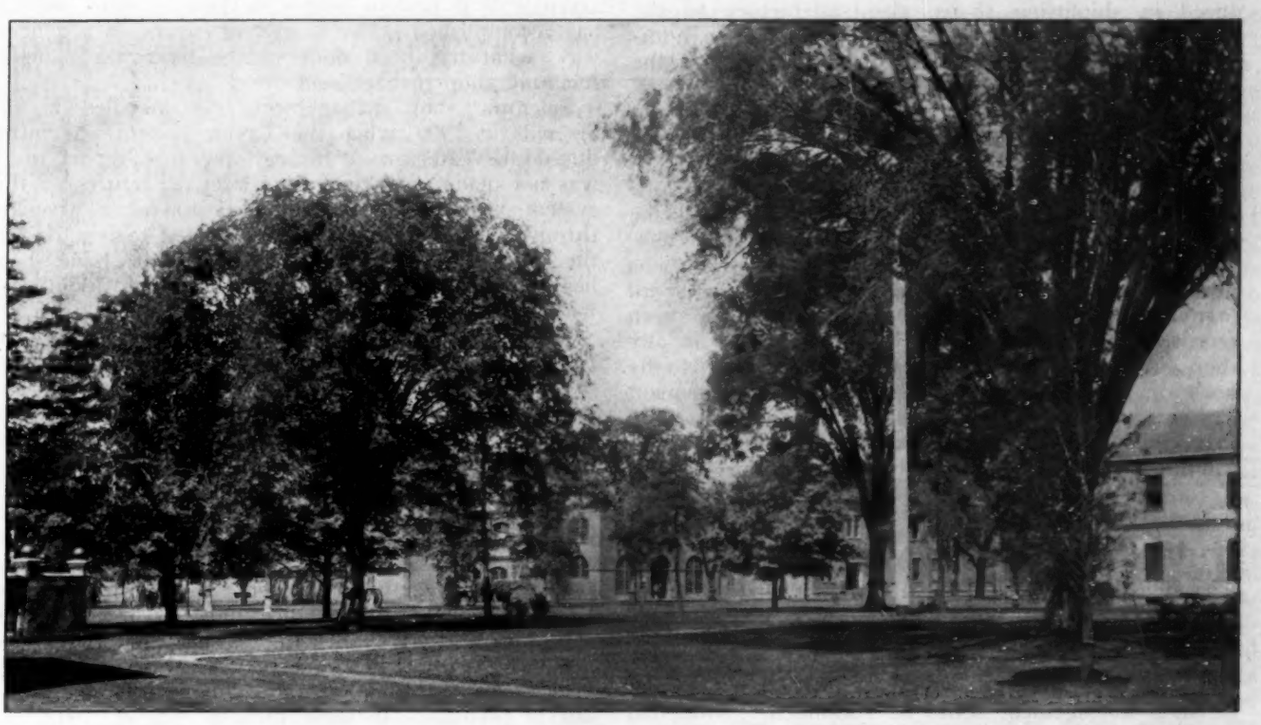
Facts and Figures Showing What the People Stand to Lose Through the Abolition of Scientific Management in Government Shops—Lower Wages the Result

BY L. W. MOFFETT

ORGANIZED labor and politics exacted a high tribute from the American people when they successfully conspired to drive scientific shop management from the government arsenals and navy yards. Rider legislation, odious in virtually all cases, was naturally resorted to by the labor unions to win their long fight against paying the efficient man more than the inefficient. Moreover, the last days of congress are timely to drive through pet legislation because of the extreme desire on the part of everybody to get through and go home.

Congress was compelled to yield to riders in the recent navy and army appropriation bills abolishing time studies and premium payments from arsenals and navy yards or face an extra session, so desperate were organized labor and fawning politicians in their efforts to drive efficiency out, with the fervent hope on the part of organized labor that it will mean great inroads in the same direction on private industrial plants. Peculiarly enough, however, the enemies of efficiency overlooked the fact that the Watertown, Mass., arsenal is conducted almost entirely from funds provided by the fortifications appropriation act and their pet rider does not appear in that measure. Of the funds required to operate that arsenal, which by the way is the only one where the Taylor system of scientific shop management was ever fully installed, 95 per cent comes from the fortifications act, while Watertown and the Frankford arsenal at Philadelphia are the only two where the premium system prevails.

Brigadier General William Crozier, chief of ordnance of the war department, told *The Iron Trade Review* that the rider legislation has not affected the payment of premiums at Watertown and that scientific management will be continued. At the Frankford arsenal, he said, premiums have been paid partly out of funds of the army appropriation act, but the character of the work at Frankford arsenal is such that it lends itself to the piece rate system, which is not forbidden, and that plan will be employed. While systemization features have been introduced to a considerable extent in all the arsenals, the feature which relates directly to the efforts made by individual workmen and to rewards given for good results have been applied at the Watertown arsenal only. This feature involved making suitable time studies and setting premium rates, the idea being that the government would be benefited by an increase of individual output and the employe would be benefited by an increase in his pay.



A PORTION OF WATERTOWN ARSENAL, SHOWING FOUNDRY IN CENTER WITH MACHINE SHOP ON THE RIGHT
Photo, Harris & Ewing

Leaving the arsenals for the time, it is well to turn to the navy yards, where scientific shop management has been much less in evidence, partly because of the fact that 80 per cent of the navy yard activities consists of repair work, which has not been standardized to any extent. Also there is the time honored difference of opinion between the constructors and the line officers as to the proper method of administering navy yard affairs. Another reason why scientific management has not been employed so extensively in the navy is that heads of departments have not fought, in season and out of season, against

strong odds, including organized labor and politics, as has Gen. Crozier, to extend the system.

However, the navy yards are hit hard by the rider legislation, which becomes operative on June 30, of this year, to continue one year at least, although confidence has been generally expressed that the higher cost of production resulting to the government, and therefore to its taxpayers, and the reduced wages workmen will receive, will quickly compel congress to omit the riders hereafter.

The well-known Halsey premium system, providing for suitable bonus payments, is operated at the Mare Island, Cal., navy yard. It applies to the flag shop, sail loft and boat shop and was installed with the consent of the employes. It has been in use over two years and the employes have been perfectly satisfied with it. In the face of this, however, the rider clause in the naval act will require a discontinuance of this system, working a hardship on those who have been paid in accordance with it. At the Norfolk, Va., Charleston, S. C., Boston, and Philadelphia yards the piece work plan is based on a system introduced in shipfitting shops, also satisfactory to the employes. It guarantees a full day's wage in addition to dividing earnings with the employe when the task is performed in less than the standard time. This system will have to be changed to direct piece work, which will be difficult for the supervisory force without making further time studies.

At the New York yard the straight piece work system is used in the shipfitting shop and will be continued. Straight day work is done at the Washington yard. The Taylor system in its entirety has never been introduced in any navy yard, and all premium, bonus and piece work systems have been accepted by workmen before being introduced in any shop. It is a most remarkable fact that virtually none of the objection to scientific shop management has ever come from employes working under it, and that which has been made pertained to only certain conditions of the plan.

Navy Yard Construction Costs Go Up

THE NAVY yard at New York is building a battleship, the one at Philadelphia a transport, and the one at Boston a supply ship. Each one of these contracts, taken with the intention of producing the ships as cheaply as they can be made at private plants, was accepted with the idea that the present systems of shop management could be continued. Now that it will have to be abandoned, affecting the yards at Mare Island, Boston, Philadelphia, Charleston and Norfolk, heads of departments which are overseeing work are clearly puzzled and worried, realizing they will have to pay a greater amount of money for less efficient work, as well as higher overhead charges, and face an increase in the time necessary to do the work. The matter of supervision alone represents 10 per cent of the overhead charges in the navy yards and this will be substantially increased when the features of scientific shop management are abolished.

At the same time it will mean a reduction in wages of 30 per cent to those employes who have worked under the system. The average premium paid in the Mare Island flag loft, employing on an average of 10 women, has been approximately 30 per cent above the day wage varying from $2.24 to $2.40. In the boat shop at Mare Island the daily wage paid to 20 to 40 employes ranged from $4.56 to $3.04, while the premium earned above that was 35 per cent. The daily wage in the sail loft at that yard was $4.48, and the bonus increased this amount 20 per cent for the eight to 16 men employed in the shop. These are samples of the general situation with respect to navy yards where scientific management is only partially employed. Although the workman has increased his earnings, the cost of production has been greatly reduced and assurance had been given the employes there would be no cut in rates paid to them.

The statement was made by one who has studied scientific shop management in navy yards that the efficiency of the workmen has been actually shown to be only 35 per cent of that attained when an incentive is offered. In other words, it would practically require one man three days to do as much under a daily wage system as he would do in one day under a system of scientific shop management.

What Scientific Management Has Done

BECAUSE of the broader field afforded for the operation of scientific shop management in the arsenals, it is best to return to them to show what it has accomplished. The foregoing covers, in a general way, what has been done in the navy yards under scientific shop management.

Scientific shop management was installed in the arsenals in 1909, when the Taylor system was introduced at Watertown, although the first report on it was not made until two years later. Features of this system were gradually extended to other arsenals, through the untiring zeal of Gen. Crozier, despite the abuse and misrepresentation that have been heaped upon him by labor agitators and politicians with "method in their madness".

At the Watertown arsenal the time study and premium features were extended from year to year to branches of the establishment which had not previously enjoyed them and the amount of premium work in most of the individual branches has been increased. As there is but little repetition work at the Watertown arsenal and as the number of men who are capable of making time studies is limited, it was possible to have only a portion of the force at any given time engaged upon premium jobs. Despite these factors, however, success was achieved. In August, 1912, for instance, only 114 men of about 600 employed at that plant worked under the premium system. In August, 1913, this number had been increased to 236; and while the amount paid out in premiums to these men in August, 1912, was $1,037.91, the amount so paid out in August, 1913, was $2,258.51. In May, 1913, 66.95 per cent of the entire working time in the foundry was spent on premium jobs, and in the machine shop this percentage was 45.68; in August, 1913, the percentage in the foundry was nearly the same, namely, 67.18, but in the machine shop the figures advanced to 53.51 per cent. In August, that year, the average premium earned by molders for the time they worked on premium jobs was 27.64 per cent of their day rate, and for the machinists this average was 26.96 per cent. The total amount paid out in premiums during the 17 months from Jan. 1, 1912, to May 31, 1913, was a little more than $22,000. This was above and over the regular wages, which were the same as those in other shops in the vicinity, no reduction having been made.

The practical effect of scientific management has been a material reduction in the cost of general manufacture. The most important manufactures at the Watertown arsenal are seacoast gun carriages, which

are large structures, with hundreds of parts, requiring many months for their completion. Following are examples of the decrease of production and are illustrative: Five different orders, each for 40 sets of parts for the alteration of 12-inch mortar carriages, were given at one time. The first two orders were executed before the introduction of scientific management. The average cost per set of these two orders was $1,536.73. The third order was carried through after some little progress had been made in the new method of management, and the cost per set under it was $1,120.32. The last two orders had the benefit of most of the improvements and under these the cost per set was $988.36.

Another example is found in the case of 6-inch disappearing gun carriages. Under an order for three carriages which was executed under the old system the cost of each carriage was $24,618.31. Under the new system the cost of each carriage, under an order for two, was $18,103.13. For the sake of accuracy, however, it is explained that the first order had to stand the cost of the patterns, but the benefit to the last order would in no wise overcome the difference in price. In the case of the parts for the mortar carriages, the direct labor cost per set was reduced from $411 for the first order of 40 to $275 for the last order, and that of the indirect labor and other shop expenses was reduced from $358 to $332. In the case of the 6-inch disappearing gun carriages the cost of the direct labor was reduced from $10,239 to $6,949, and that of the indirect labor and other shop expenses from $10,263 to $8,956. Another example at the Watertown arsenal relates to cutting gears. Under the old system a certain machinist cut a gear in 329 minutes. Of this 152 minutes was the running time of the machine, which the man could not alter, leaving 177 minutes as the handling time, occupied by the man in taking out finished gears, putting in new blanks to be cut, adjusting cutters, etc., so that the 109 minutes finally saved were out of the 177 minutes handling time. The cost of the gears before putting the man on the premium system had been, for his own labor, for the labor of his helper, for the cost of running the machine, and for indirect expenses, $4.75 each. The final cost for these same items was $3.28 each, making a saving of $1.47 per gear, or 44 per cent. Now as to the effect on the man's pay: He cut each gear in 80 minutes less than the 300 minutes which were given him as the time within which he would be paid a premium; he was, therefore, paid, at his rate of 41 cents per hour, for 40 minutes for each gear, and as he cut a gear in 220 minutes he thus made 40 minutes' pay, or 27 cents, every 220 minutes, which is at the rate of 7.45 cents per hour, an increase of about 18 per cent over his regular rate, which would raise his entire day's pay from $3.28 to $3.87.

Still another example is that where the time of producing a mold for the pommel of a saddle was cut down from 53 minutes under the daily wage scale to 20 minutes. When these molds were produced in 53 minutes each their labor cost, including helper and all the direct and overhead charges, was $1.17 each. When they were made in 20 minutes each this cost was reduced to 54 cents. There was thus a saving of 63 cents on each mold, and as, at the 20-minute rate, 24 molds were made per day, the net daily saving to the government upon this one molder's job was $15.10. The pay of the time study man, a high priced specialist, was $15 a day; so that his entire day's pay was saved on this one job. When the molds were made at the rate of 53 minutes each, under day wages, the molder earned $3.28 per day; when they were made in 20 minutes each, under the premium plan, the molder earned $5.74 per day.

The reduced cost of production at the various ordnance establishments, due to the improved methods of manufacture and to the premium system, were made with practically no reduction of wages of employes; on the contrary, there was a large number of increases in day wages at all the arsenals, and the earnings of those on a piecework or premium basis were increased considerably. Due to the existence of these savings, the estimates for fiscal years have been reduced from time to time, thus giving the most practical expression to the result obtained. The savings for the fiscal year 1912, for instance, amounted to over $240,000, which was used to increase the amount of work done and material manufactured under the various appropriations from which the savings were made. The estimates for the manufacture of small-arms ammunition for the fiscal year 1913 were reduced by $150,000 below the immediately preceding appropriations; but for the reduced sum just as much ammunition was procured as was possible under the higher appropriation. The estimate for the manufacture of small arms was $100,000 less; the number of small arms made was not as great as during the preceding year, but it was not diminished in proportion to the reduction in the estimate.

Gen. Crozier has pointed out that it is a difficult matter to give in figures the amount of advantage which has accrued to the government from the use of the system. There is very little repetition work. Also, none of the product of the arsenal is procured from private makers, so that comparisons with commercial establishments cannot be made. A private concern has conclusive evidence as to the increase of economy and efficiency in production in the effect upon the profit available for dividends; but this

Table I

DATA ON PREMIUM SYSTEM AT WATERTOWN ARSENAL

	Number employed on premium work.	Average premium over and above the regular pay expressed as a percentage of the latter.	Percentage of all the work done which was performed under premium.
Molders	11	29.27	77.51
Machinists	167	28.18	54.39
Machinists' helpers	29	28.08	12.98
Laborers	29	22.03	9.62
Carpenters	8	29.50	18.59
Blacksmiths	5	20.59	13.93
Teamsters	5	26.87	98.59
Blacksmiths' helpers	6	19.29	12.40
Carpenters' helpers	1	31.43	0.31
Screw makers	1	34.16	100.00
Chippers	1	42.01	27.79
Furnace helpers	1	23.11	2.09
Steam-hammer drivers	1	27.01	3.41
Skilled workmen	1	23.16	18.19
Masons' helpers	1	28.06	35.51
Molders' helpers	3	65.38	1.74
Painters	2	10.10	11.81
Skilled laborers	2	22.74	19.79

highly satisfactory method of estimating efficiency is not applicable in government establishments. Analyses of a large number of different jobs, taken at random, made both in the fiscal years 1912 and 1913, show that the production of the individual when working under the premium system, with the rate set after careful study, is between two and a half and three times that under ordinary daywork system. This amazing showing, as pointed out in the foregoing, is almost identical to that made in the navy yards.

It should also be distinctly remembered that when time is gained in this way there is a saving not only of the pay of the workmen, but also of the overhead charges, which, frequently, are considerably higher. A computation might be made as to the total saving to the government upon this basis as compared with what the cost would have been expected to be under the daywork system. The resulting figures would be startling.

It might be stated, however, that there was revoked from allotments made Watertown arsenal for doing its work during the fiscal year 1913, the sum of $73,401.05. This is the actual saving as compared with the amount which it was estimated in advance that the work would cost. It must be remembered, though, that part of these estimates were made in expectation of the use of the system which resulted in the savings, so that it does not afford a full estimate of the value of the system as compared with an estimate of the cost which might have been made without it. At some of the other arsenals the situation is better in this respect, for the reason that similar articles are both fabricated at the arsenal and procured from private manufacturers.

Direct Comparisons

AT THE Frankford arsenal this has been true to a great extent, and as a result it is computed that in the manufacture of artillery ammunition and small arms ammunition at that arsenal a saving of over $1,500,000 was made during the fiscal year 1913, as compared with what the same ammunition would have cost if obtained from private establishments at the best prices which were offered. Furthermore, in the manufacture under contract of these same two classes of ammunition, $400,000 more was paid than it would have cost to make it at the arsenal. The Taylor system was not employed in the manufacture of artillery ammunition or small arms ammunition at Frankford arsenal, but that arsenal had for a long time practiced the piecework system of payment and later introduced a premium system, paying careful attention to the principles of efficiency.

In the face of this showing, it is no wonder that Senator Penrose and Senator Oliver received a vigorous protest from a committee representing 400 employes at the Frankford arsenal against the legislation in the army bill depriving them of their premium rate of compensation, which, as the employes said, "was established at this arsenal over five years ago to the mutual satisfaction of all concerned." The enactment of the legislation, according to the employes themselves, meant an annual loss of about $44,972 in wages. But it did not matter to organized labor what the desires and rights of these employes were. Organized labor arrogated to itself a high-handed tyranny, enforced by self-seeking politicians, and crushed the ambitions of the good workmen, the best workmen, the energetic workmen, taking the heart out of them and reducing them to the level of the indifferent workmen. At the same time they increased greatly the cost of production for the government, which will also get a much smaller quantity of ammunition and ordnance stores from its appropriations.

Results similar to those obtained from operating the efficiency system at Watertown and Frankford arsenals also were achieved where features of the system were employed at the other arsenals, Rock Island, Watervliet and Springfield. Recent figures, showing results of the system as applied at Watertown arsenal for August, 1914, are given in Table I.

Results at Watertown

IT WILL be observed that during the month the 11 molders, for instance, worked, upon the whole, 77.51 per cent of their time upon premium work, and that during this time they earned above and over their daily wages a sum which amounted, as a whole, to 29.27 per cent of such wages. As their regular wages vary from $3.04 to $3.68 per day, they thus earned during 77.51 per cent of their time an extra amount per day varying from about 90 cents to $1.10. Premiums also are paid to the foremen, which depend upon the number of their men who are given work upon premium jobs and upon the amount which is made by the men. Under this system there was paid to the eight foremen for August, 1914, a sum averaging about 10 per cent of their regular wages. Including this last sum, the total amount which was paid out in premiums at the arsenal for that month was $2,657.29 and the total amount of time which was spent in work under the premium system was 26.25 per cent of all the working time at the arsenal during that month.

The advantage to employes and the government alike through the efficiency system has been demonstrated so often and so completely that to further dwell upon it would be a matter of tiring repetition. The so-called disadvantage to the employes, who are held by organized labor to be under their protection, has included two principal items; First, an employe, such as a machinist, of high grade is not given opportunities to earn premiums under the system as numerous and as profitable as are those which are given to machinists of lower grade, the accompanying allegation being made that an object of the system is to do away with the high-grade machinist and substitute for him an abnormally stimulated man of lower grade, developed to great speed along one line only, and of less general value in industrial work than the high-grade man whom he is intended to displace. The figures at the Watertown arsenal obviate any necessity for discussion of the question of the desirability of the substitution of low-grade special workers for high-grade all around artisans, which is a process striven for in all manufacturing operations. At the arsenal high-grade machinists receive $3.52 per day, low-grade machinists $2.56 per day, and certain machine operators $2.40 and $2.24 per day. During a certain recorded period there was paid to the high-grade machinists for their increased earnings under the premium system a sum averaging $426.14 each, which was equivalent, for each one of them, to 121 days' pay. There was paid to the low-grade machinists, the $2.56 men, a sum averaging $144.74 each, amounting to 56 days' pay; and there were paid to the $2.40 and $2.24 machine operators sums amounting, respectively, to $117.22 and $32.74 each, or 49 and 14 days' pay. The great relative advantage for the high-grade man is thus seen at a glance, and this particular charge in regard to the effect of the system is shown to be at absolute

(*Continued on page 992b*)

Keep Record of Electrical Repairs

A Definite System of Reports is Advisable to Keep Track of Maintenance Cost of Electrical Equipment in Large Steel Plants

BY G. E. STOLTZ

NOT many years ago the use of electricity in steel mills was given little prominence; lighting being its only application to any extent. It was later found that economies could be realized by substituting motors for the small engines on the various drives about the plant, and electric power is now finding favor on the rolling mills proper. When electrical apparatus was first introduced in steel mills, it was often placed in the care of the steam engineer, and was given no more attention than that required to keep it running. Today the plants having a large amount of electrical apparatus are equipping their electrical departments with testing apparatus to check the performance of all their machines, a clerical department to carry on their correspondence and keep records of cost of operation and maintenance and a drafting room. Some companies give the electrical superintendent access to the main drafting room to prepare plans for new apparatus. In other words, the electrical man has been added to the engineering or operating force to constantly suggest schemes of reducing the cost of producing the tonnage output. While the operators were advancing from the position of repairmen to engineers, the manufacturers developed special sales and engineering departments who could become thoroughly familiar with the problems involved and work intelligently with the operators.

Lackawanna Steel Co. Elec. Dept.
Motor Changes
Date..... 191...

Mill Electrician's Report.....
Old Motor No..... Arm. No.....
New Motor No..... Arm. No..... } Operator.....
Location No..... Operating.....

Was Damaged About..... A.P.M..... 191...
As Follows:.....

Cause of Damage.....

Amount of Delay.....
Repaired by Insertion of Following:.....
(a) Spare Armature.....
(b) New Brush Holders.....
(c) New Field Coils.....
(d) New Bearings.....
(e) Other Parts.....
Remarks.....

.....Mill Electrician
.....Div. Foreman
.....Supt.

Note:-Make Separate Reports for Each Motor Change.

FIG. 1—ELECTRICAL REPAIR SHEET OF LACKAWANNA STEEL CO.

The important items which enter into the selection and operation of apparatus are:

1. Initial cost.
2. Economy or efficiency.
3. Attendance and inspection.
4. Oil, waste, etc.
5. Labor and material for repairs.
6. Depreciation, interest, taxes, etc.
7. Natural adaptability of apparatus to application.

The first two items are always very closely scrutinized when the apparatus is purchased, and a check is easily obtained on the cost of the third and fourth items. The seventh item is difficult to definitely capitalize, but in many cases it enters into the aggregate saving just as surely as increased economy. One operator stated that his company saved several hundred dollars simply because they were able to couple up its mill more quickly with a motor than an engine. The drive in question was a sheet mill. If it was desired to couple on several stands after replacing a broken roll, a number of trials would probably be required with an engine, as it could not be stopped as accurately as a motor. However, with the latter, the mill could be fairly inched along until the coupling was slippped in place. The actual cost of labor and material for repairs, and depreciation, as listed above in items Nos. 5 and 6, is not found with ease, which naturally accounts for the slighted attention it often receives. It is important as its yearly cost is generally in excess of the interest on the initial investment. Suppose a 30-horsepower mill type motor is purchased at a price of $500. The interest on this investment at 6 per cent is $30. If the upkeep on this motor is not excessive its repair cost may average

A paper read March 6, 1915, by G. E. Stoltz, steel mill engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., before Association of Iron and Steel Electrical Engineers, Pittsburgh.

$9 per year. Its depreciation at 8 per cent would be $40. The repairs and depreciation on this particular machine exceed the interest on the original investment by $19 or 3.8 per cent of the investment.

Practically all plants have their daily report sheets which are sent to the electrical department, specifying the repairs made and consequent delays incurred. Each company knows in its own way the cost of upkeep, but it would no doubt be better to adopt some standard method of keeping a record of repairs and depreciation.

A summary could be made of the inspectors' reports and at the end of the month it could be determined for each line of motors what per cent of failures are due to commutators, armatures, bearings or fields. Figs. 1 and 2 are typical repair sheets which, in general, represent practically the same features covered by the scheme used in most steel plants. These two sheets are different in form, but it will be found that the data to be inserted is practically the same. It would not be policy to try to get too much data on these sheets as they would become burdensome and would not receive the attention desired from the inspectors. There would be a number of factors which would influence the results obtained, but all of them would be local, and well understood by the operator when the summary sheets were compared.

The segregated cost of repairing each particular line of apparatus could be tabulated on a sheet similar to Fig. 3. By specifying the type of motor at the top of the sheet the form could be used for any make in the plant. The inspectors report their opinion of the defect and cause of failure, both of these items would, of course, be checked in the repair shop and the correct data placed in the monthly summary sheet. Should the inspector and the repairman disagree, the electrical superintendent could give it his attention, and as much profit would be gained as if correct data were submitted by each. It is just as important to discover discrepancies in the inspectors' reports and correct their interpretation of the trouble as to know the full details of the failure itself.

In one column is a space for the time lost to the mill while the repairs are being made. Very often the apparatus can be modified during a period when the mill is down, and no delay incurred. At one plant we were told that it was estimated there was a loss of $500 each hour their blooming mill was delayed. It is difficult to place a definite value on these delays, but no one appreciates their importance more than the operators of a steel mill.

The first half of this sheet would be compiled during the month as the apparatus is repaired, and the latter half at the end of the month, as it is simply an itemized review of the former. The data given here is taken from the records of a plant which gives considerable thought to the cost of repairs. It will be noted in Fig. 3 that the upkeep of the 100-horsepower motors is the prominent feature of this table as they are failing at the rate of 34.8 per cent per year, which is excessive in comparison with other sizes. Viewing the table from another point we find that 9.4 per cent of the motors are repaired due to flat commutators, which indicates another feature to be investigated.

This sheet brings out distinctly the relative cost of repairing different parts of each line of motors. In order to compare the cost of repairs from month to month, it is advisable to plot curves, a point being added each month. This curve would show graphically for a period of years the cost of operating the electrical department in any plant. Another curve would show the total cost of inspection, labor and material for repairs. In addition to this curve, others should be plotted for each line of motors which would permit the operator to compare the cost of maintaining each line of machines in his plant.

All this work could be performed by a clerk and at the end of each month only a very short time would be required for the electrical superintendent to check the cost of operating his department as compared with previous months. The actual figures obtained could be reviewed, but they do not convey the facts so clearly and rapidly as can be done graphically. Suppose it was noticed that the cost of repairs on some particular feature of a certain make of motors was predominant. This could soon be investigated and the reason for the high maintenance cost determined. It might be that a large tonnage output justified the abuse of the electrical apparatus, or some adjustment or change in the control would more adequately protect the motor. The operation of a charging machine could be slowed down to better protect the apparatus, but the reduced maintenance cost on an application of this kind would not be justified where it is important to handle the metal with great dispatch and obtain a larger tonnage output. However, there are examples of motors being reversed or plugged by foreign operators who do not appreciate the characteristics of electrical machines. Manual control could be replaced by magnetic switches which would give slower operation when starting and reversing, but would not in any way interfere with the tonnage record.

At one of the largest steel plants of the country after compiling data for a period of time, the electrical superintendent determined that a large percentage of his motor trouble developed at the commutators. To remedy this he designated a capable man from his department to do nothing but study commutation problems. This man is trying out different types of

_____ Department — Day Turn
_____ Inspector's Daily Report — Night Turn

Inspection and Repairs	From	To	Lost Time

Armature Changed

Mill No. of Motor	H.P.	Type	No. Arm. Taken Out	No. Arm. Put in	Cause			

Motors Changed

Mill No. of Motor	H.P.	Type	Ser. No. Taken Out	Ser. No. Put in	Cause			

Inspector — Total Lost Time

FIG. 2—ANOTHER TYPICAL REPAIR SHEET

brushes, has studied the results obtained by undercutting, and in general, has become expert in his particular line. Very satisfactory results have been obtained as the maintenance cost has been reduced quite appreciably.

At another place it was discovered that the failure of bearings on a certain line of motors was excessive. The increase in the total maintenance was hardly noticeable, but by careful analysis it was found that this item was entirely out of proportion. The electrical superintendent is now giving his close attention to this item and may find it can only be eliminated by purchasing a more expensive bearing. Another firm had approximately 180 motors of one make and seven of another. All operated under practically the same conditions, but the maintenance on the seven motors was far in excess of the total repairs required by the remaining 180. The loss of time and cost of repairs for the seven motors was so great that the electrical superintendent asked to discard them entirely, stating that a saving would be enjoyed by replacing them with the better type of motor. He had no definite data to present to the general superintendent and was unable to convince the latter to his way of thinking. If definite figures could have been shown to the general superintendent which would bear out the electrical superintendent's opinion, there is no doubt but what he would have been sustained.

An electrical superintendent in an Ohio plant places the supervision of all his apparatus under two general foremen, who report directly to him. Definite records and curves are compiled and the results given to both foremen. Naturally considerable rivalry exists between the two men, and every effort is exerted on their part to make a good showing without any direct pressure being exerted by the electrical superintendent. If this scheme was followed out to the extent of placing the result of the monthly reports in the hands of the inspectors directly in charge of the apparatus, a certain amount of interest and pride would be developed by each department without any direct effort on the part of the electrical superintendent. If the men in the "rank and file" of the department can see for themselves exactly what is happening and are allowed to compare the performance of the apparatus in their department with that in other departments, better economy cannot help but result.

This scheme would also automatically advise the electrical department of any apparatus giving unsatisfactory service before it is brought to their attention by the general superintendent, or by some other department. Efficiency departments are being organized whose duty it is to pry into the management of the different departments and make suggestions to reduce the cost of operation. With a definite scheme as is suggested above, the superintendent will be advised of bad applications before they are brought to his attention by the efficiency departments.

Occasionally the electrical man is aware that certain applications have excessive delays and maintenance, but is unable to persuade the mill superintendent to change the installation in any way which would involve an increase of cost. If actual data could be given to the mill superintendent outlining to him the cost of maintaining a certain apparatus for the year, he could be more easily persuaded to make a change such as replacing manual operated controllers by magnetic switches. One electrical superintendent stated that he had difficulty in introducing magnetic control as it was necessary to obtain the approval of the mill superintendent involved before the expenditure could be made. However, after carefully analyzing the total upkeep of motor with the two different controls on certain applications, the mill superintendent became more enthusiastic about magnetic control than the electrical superintendent.

Very often data compiled in such a complete form can be used to advantage for other information than that for which it was primarily compiled. At one plant an alternating current load having poor power factor was added, and it was found desirable to raise the power factor on the whole system. The electrical superintendent at this plant not only kept a record of repairs, etc., but had taken graphic curves on each motor installation which were characteristic of the load cycle to which it was subject. After reviewing his repair chart, it was found that the maintenance on motors carrying practically full load was very little in excess of that for the machines under-loaded. It was therefore decided to replace the latter with smaller motors so that practically all of his machines were working full load. After all changes were completed the increase in power factor was 8 per cent.

It is difficult to assume a depreciation charge on electrical apparatus as the life of each line of motors not only depends on their construction, but on the service to which they are applied. No doubt in some cases their depreciation and repairs are so great that it would be far better to purchase new apparatus and throw the old out. The life of a mill motor which is subject to continuous reversing duty naturally could not be expected to be as long as a machine installed in a clean room where excellent care is taken of it, and its load is practically constant. Nothing but definite figures kept for a number of years can determine the actual depreciation which should be charged against a particular type of machine.

If complaints could be brought to the manufacturers with actual data concerning the performance of their apparatus, they could obtain similar information from other plants and soon come to a conclusion as to whether the trouble is local or general. The manufacturers are not anx-

(*Continued on page 992b*)

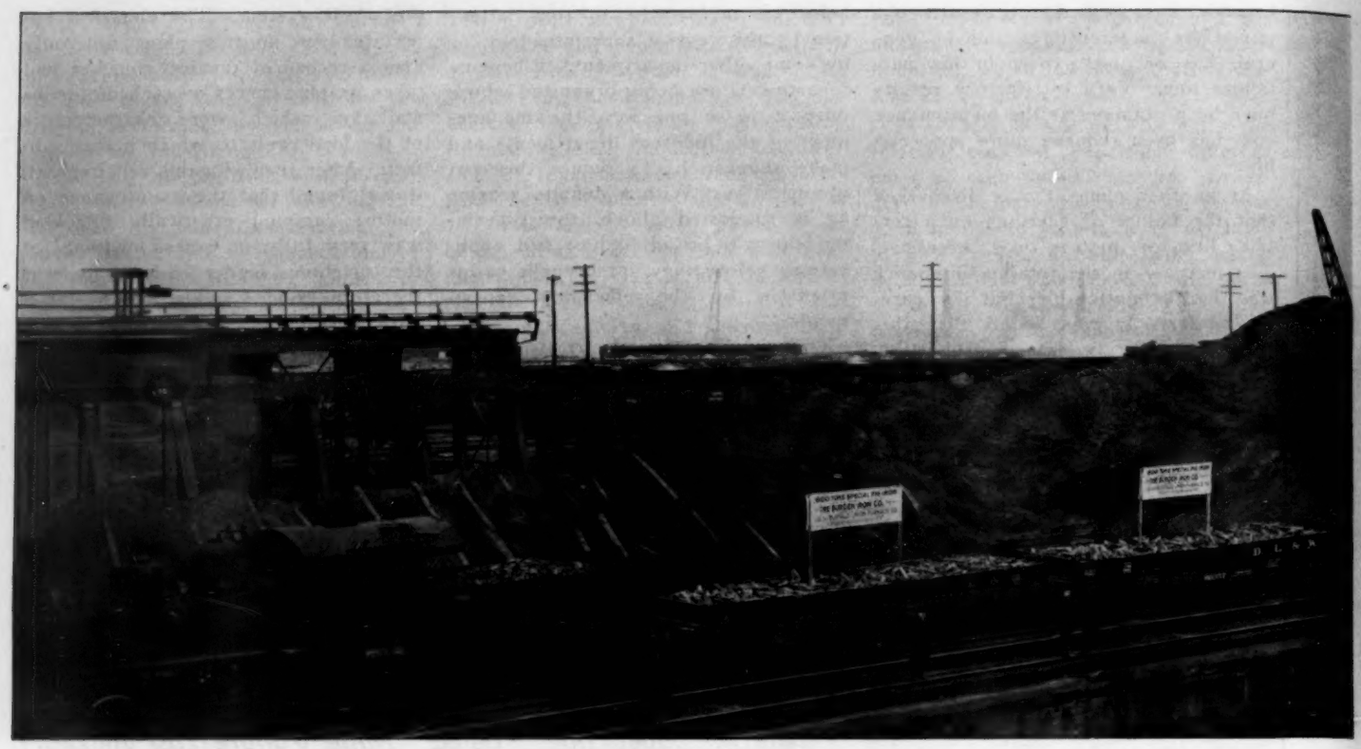
Type Motor Repairs

Jan. 1, 1914 – Dec. 31, 1914

Date	Motor H.P.	Motor Type	Application	Defect	Repairs Made	Cause Failure	Time Lost	Cost Repairs

H.P.	No. in Use	Commutator Gr'd.	Commutator Flat	Armature Gr'd.	Armature Shunt	Flds.	Brgs.	Band Wires	Total	Per Cent.
30	23		3	1					4	17.4
40	20	1				1		1	3	15.0
50	19	2	2		1				5	26.3
100	23		3	2		2		1	8	34.8
Total	85	3	8	3	1	3		2	20	
Per Cnt.		3.5	9.4	3.5	1.2	3.5		2.4	23.5	

FIG. 3—REPORT ON MOTOR REPAIRS



The above illustration shows an unusually interesting shipment of pig iron made recently from the plant of the Buffalo Union Furnace Co. printed "600 Tons Special Pig Iron, Sold by M. A. Hanna & Co., of Cleveland, O., to the Burden Iron Co., of Troy, N. Y. Made in Buffalo by the

Cold Producer Gas for Reheating Furnaces

Producer gas is commonly utilized for firing billet or bloom heating furnaces operated in connection with rolling mills. Usually, however, a hot gas producer is installed near the furnace, the gas being conveyed through specially constructed brick flues or brick-lined pipes. The use of clean, cold gas for furnaces of this type, however, has certain advantages, among them being that the producer may be located at any convenient point and the gas carried in ordinary pipes. In order to demonstrate the effectiveness of cold gas for billet heating furnaces, a test was made on a furnace installed at an eastern steel plant, the gas being furnished by a producer built by the Smith Gas Power Co., Lexington, O.

The fire was lighted in the cold furnace at 8:45 a. m. and by 2 p. m. a temperature slightly in excess of 2,500 degrees had been obtained over the hearth, which was 10 feet wide, the gas burners being located at one side. At 2:20 p. m. the furnace was charged with 1,500 pounds of 4-inch square steel billets of high carbon content, which are said to be particularly prone to oxidation while in the furnace. While charging, the gas was shut off from the furnace, and at the end of the charging period the temperature had fallen to 2,120 degrees. As soon as the furnace was closed the temperature began to rise, reaching 2,290 degrees 35 minutes after the cold billets were charged. In order to give the billets a soaking heat they were allowed to remain in the furnace for one hour and 15 minutes, the temperature during the last 30 minutes ranging from 2,300 degrees to 2,340 degrees.

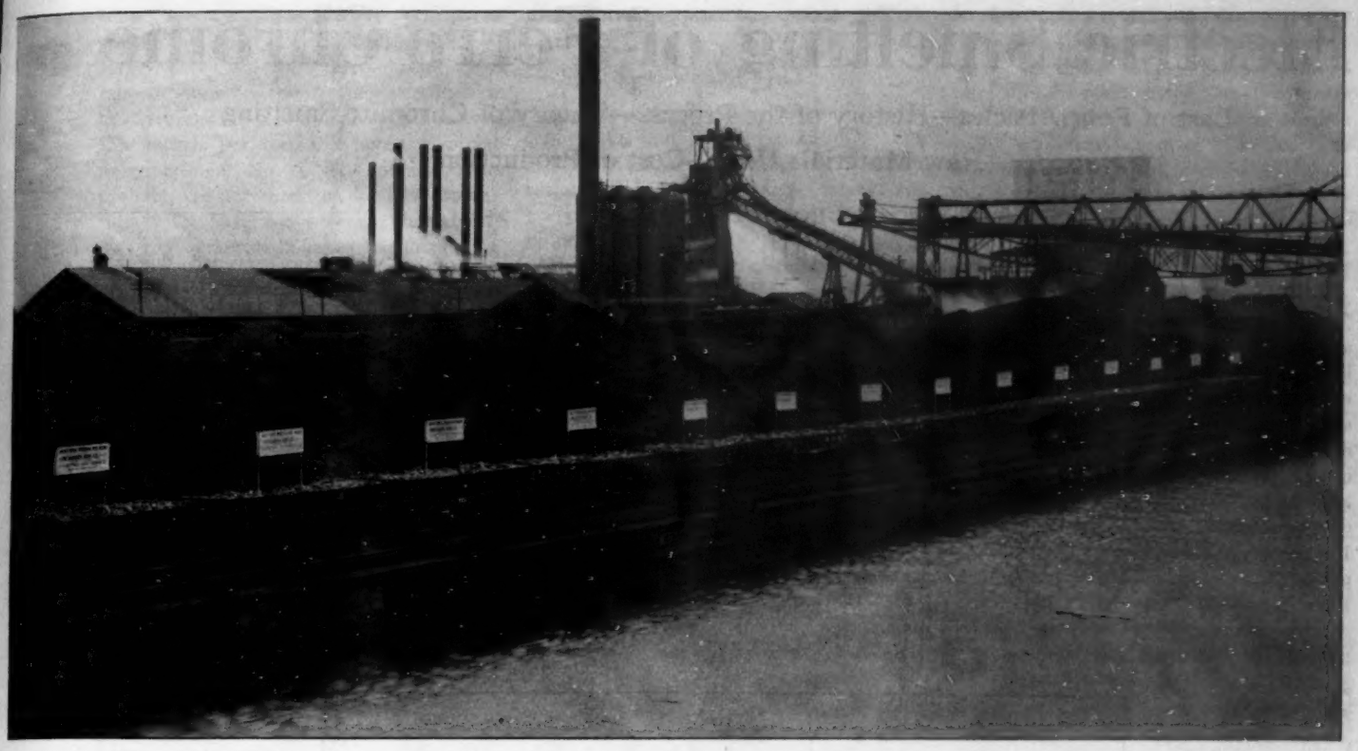
At the expiration of this time, the charge was deemed properly heated, and was rolled. It is said that there was no sign of burning either on the billets or the finished steel, although temperatures 200 degrees higher than ordinarily used in rolling steel of this quality had been attained. The producer consumed 130 pounds of coal per hour.

Metal Lath Handbook

The Associated Metal Lath Manufacturers, Youngstown, O., have issued a handsomely illustrated book entitled "Metal Lath Hand Book". The book is designed to place before architects and contractors correct methods of using metal lath. Records of various scientific experiments, particularly in reference to fire tests, are shown. The book is profusely illustrated and shows equipment made by the following companies: American Rolling Mill Co., Middletown, O.; Berger Mfg. Co., Canton O.; Bostwick Steel Lath Co., Niles, O.; Consolidated Expanded Metal Co., Braddock, Pa.; Corrugated Bar Co., Buffalo; Penn Metal Co., Boston; Garry Iron & Steel Co., Niles, O.; General Fireproofing Co., Youngstown, O.; North-Western Expanded Metal Co., Chicago; Sykes Metal Lath & Roofing Co., Warren O., and Trussed Concrete Steel Co., Youngstown, O.

Reports Recent Sales

Recent sales reported by the Kerr Turbine Co., Wellsville, N. Y., include the following: City of Atlantic City, N. J., 18,000,000-gallon turbo-pump; city of Baltimore, 500-kilowatt turbo-generator; city of Williamsport, Pa., 425-horsepower turbine for driving a pump; city of Youngstown, O., two 250-kilowatt turbo-alternators; dredge Columbia, Portland, Ore.; two 100-horsepower geared turbines; Swift & Co., Chicago, three turbine units; Christian Moerlein Brewing Co., Cincinnati, 300-kilowatt turbo-generator; Carnegie Steel Co., Farrell, Pa., 125-horsepower turbine; Jones & Laughlin Steel Co., Woodlawn, Pa., 325-horsepower turbine; National Tube Co., Christy Park Works, McKeesport, Pa., 350-horsepower turbine. Export orders include East Hull Gas Co., Groves, England; Corporation Gas Works, Birkenhead, England, and Armour de la Plata, Argentina.



Sixteen cars were required to handle this shipment, which comprised 600 tons of special analysis pig iron. On the banners carried on each car is Buffalo Union Furnace Co." The consignment is said to be one of the largest ever made from any Buffalo blast furnace plant.

Statistics and Accident Prevention

How best can accidents be eliminated or reduced in number and severity? To properly answer the question requires a careful study and analysis of accident causes, and this requires data which is largely lacking in American factories. Some of the older countries have far outstripped the United States in accident prevention, not because of any greater ability or aptitude, but rather from their systematic study of cause and effect. It does not take us long to act if it is plain what we should do. Covering a hole with a board after a man has fallen in is not enough. Why is the hole there? Can it be filled up? If not, we should have a substantial railing around it. Some one forgetting the accident might pick up the board; the railing will stay.

In 1911 we found our company had 150 accidents costing $1,089. We had the money cost, but not the details to investigate causes and provide proper corrections.

Late in 1911 we set about keeping record of our accidents in such a way that we had all the facts, causes, different classes, etc., and at the end of September, 1912, the record showed a total of 143 accidents for the year divided as follows: Foot, 21; eye, 47; hand or finger, 48; scalp or face, 6; burns and scalds, 3; miscellaneous, 18.

In the meantime we set about a careful study of the various accidents, their causes, and how they could be avoided. This was done so successfully that the total cost of accidents for the year ending Sept. 30, 1913, was but $390, and the total time lost on account of accidents had been reduced to 218 days, or less than 0.1 per cent of the total number of work days.

Another thing we had found was that more accidents could be prevented by educating, instructing and interesting the workers than by any other means.

The following percentages taken from 1913 data is interesting as showing where study should be directed:

Accidents preventable by proper safeguards	4
Due to pure carelessness of employe	26
Due to carelessness of fellow workmen	4
Purely accidental or incident to business	66

In the last class are included all such slight cases as getting dust in the eye, dropping castings on toes, etc.; their number can only be reduced by greater thoughtfulness and care on the employe's part. This we are stimulating by instruction, committee work, and competition prizes, as well as by publicity among the different departments.

Pumps for Canal Cranes

After spending over $1,000,000 for two 250-ton floating cranes for the Panama canal, the government finds that further equipment is necessary to make the machines thoroughly serviceable in the canal district. These cranes, it will be remembered, were purchased from a German firm, and one of them, the Ajax, failed while being tested as recounted in *The Iron Trade Review*, Feb. 4. Both the Ajax which is being rebuilt, and the Hercules are to be fitted with pumping systems, which it is said will increase their effectiveness in salvaging stranded or sunken vessels. The pumps, although they will add to the usefulness of the cranes, will also materially increase their cost, making it even more evident that American firms, had they been given a chance, could have furnished complete cranes at a price on a par with the German bids. Each crane will be furnished with a steam driven pump with 8-inch suction for pumping out the hold of the pontoon of the crane itself, together with an electrically driven centrifugal pump provided with 6-inch, 10-inch and 12-inch suctions. Also steam driven duplex pump, 16 x 22 x 18 inches, will be provided.

Electric Smelting of Ferro-Chrome

Last of Four Articles—History of the Process—Theory of Chromite Smelting —Raw Materials Used—Cost of Production

BY ROBERT M. KEENEY

MORE ferro-chrome is manufactured in the electric furnace than any other ferro-alloy except ferro-silicon. The alloy of iron and chromium, called ferro-chromium or ferro-chrome, has been known since 1820 through the studies of Faraday and Stodarts, and also by the work of Berthier. Berthier found that by adding ferro-chrome containing 17 per cent chromium to steel, so as to give 1½ per cent chromium in the steel, a product of better quality was obtained. Baur found 40 years later that ferro-chrome was the best agency to use for adding chromium to steel. Other experimental work on chrome alloys was done by Fremy, Percy and Mushet. In 1873 Biermann, of Hanover, announced that his firm was producing ferro-chrome commercially. In 1877 the English firm of Hadfield put on the market some ferro-chrome containing 10 to 30 per cent chromium. The French firm of Holtzer & Co. also began manufacture. By 1886, as the value of chromium in steel became more understood, there were several regular producers of ferro-chrome. In 1899 there began the production of ferro-chrome in the electric furnace. Up to that date all of it had been made in either the crucible or the blast furnace.

Some experiments were made by the writer in 1912 on the production of ferro-chrome from chromite with carbon as a reducing agent. The experiments were performed in a furnace lined with magnesite, having one upper graphite electrode and a conducting hearth of iron rods embedded in magnesite. The interior dimensions of the crucible were: Width 4 inches, length 8 inches, and depth 8 inches. The furnace took 8 to 12 kilowatts of single-phase current at 30 to 50 volts. The furnace held 12 to 15 pounds of the cold charge. The chromite used was a foreign grade used commonly for furnace linings. Analyses of the chromite, coke, lime and fluorspar used are given in Table I. In these experiments, contrary to the usual European practice in ferro-chrome manufacture, lime was used as a flux to show its desulphurizing and dephosphorizing effect with an ore not so pure as the usual ore used in ferro-chrome production. In usual practice only the purest raw materials available are charged, so as to avoid the excess slag caused by adding lime. The only slag formed is from the coal or coke and chromite.

Table I.

ANALYSES OF RAW MATERIALS USED IN MAKING FERRO-CHROME

Chromite. Constituent.	Per cent.	Coke. Constituent.	Per cent.	Lime. Constituent.	Per cent.	Fluorspar. Constituent.	Per cent.
Cr_2O_3	*46.35	Fix. carbon	81.48	CaO	92.76	CaF_2	90.00
FeO	†21.45	Volatile combustible matter ..	0.25	SiO_2	1.34	$CaCO_3$	0.80
SiO_2	5.48	Ash	17.92	Al_2O_3–Fe_2O_3	1.90	Al_2O_3	8.50
Al_2O_3	12.80	Moisture ..	0.35	MgO	Trace		
MgO	10.08	FeO	1.20	P	0.06		
CaO	Trace	SiO_2	13.62				
P	0.013	CaO	0.85				
S	0.45	P	0.08				
		S	0.54				

*31.7 per cent Cr.
†16.6 per cent Fe.

Five experiments were made in which the furnace was charged and tapped at the completion of reduction. In these experiments the chromium percentage of the alloy seemed to run considerably lower than had been calculated, although this result is explained in a measure by the fact that the carbon in the metal was not considered in calculating the theoretical percentage. The carbon content was high in all of the alloys and does not seem to be influenced by the carbon in the charge as long as there is excess, which was the case. The phosphorus content also was high in all of the products. Seemingly all of the phosphorus charged was concentrated in the metal. This was caused by the excessive reducing conditions which did not permit the slagging of the phosphorus as calcium phosphate. The ore contained considerable sulphur—0.45 per cent—but almost all of it passed into the slag, probably as calcium sulphide. There was considerable loss of chromium and iron in the slag. In some cases the percentage of iron in the slag exceeded that of the chromium, but in no case did the percentage of chromic oxide in the slag exceed 9 per cent, or the percentage of chromium, 4.69 per cent, showing that in the endeavor to keep the carbon in the alloy low the proportion of coke added was not sufficiently in excess for complete reduction or that the furnace was not hot enough. The former was probably the case, as the furnace was operated as an arc furnace throughout the experiments.

In two experiments, Nos. 6 and 7 of Table II, the furnace was left full and several tappings were made during the run, the usual practice of ferro-chrome manufacture thus being followed. Commercial ferro-chrome is usually 5 to 10 per cent carbon, containing 60 to 65 per cent chromium. Details of the seven experiments mentioned above are presented in Table II. In these experiments the per centage of chromium in the alloy closely approached the theoretical. The percentage of carbon was also lower in these alloys because of the decarburizing effect of the unreduced oxide in the charge above the molten metal. The slag loss of iron and chromium was higher in these runs than in the intermittent experiments because of unreduced oxide getting into the slag on tapping.

A total of 50 pounds of ferro-chrome was tapped during the experiments, or an average extraction of 69.5 per cent. The average iron content of the slag for all experiments was 13.4 per cent FeO (10.4 per cent Fe); the average chromium content of the slag was 10.3 per cent Cr_2O_3 (6.6 per cent Cr). In the intermittent experiments the average percentages in the slag were 12.1 per cent FeO (9.4 per cent Fe) and 8.07 per cent Cr_2O_3 (5.32 per cent Cr). Thus, of the loss of 30.5 per cent of material that was not tapped, 11.9 per cent was chromium and 18.6 per cent was iron, on the assumption that of the

We are indebted to the bureau of mines, department of the interior, for the use of this material.

total average loss 39 per cent was chromium and 61 per cent iron. A large part of the ferro-chrome not tapped stuck in the furnace. Although the average electrode consumption was 158 pounds per ton, the figure obtained in experiment No. 6, 48.1 pounds, would probably be attained in practical operation. The average power consumption was 3.7 kilowatt-hours per pound, or 0.85 kilowatt-year per ton.

Results of Experiments

The conclusions drawn are, first, ferro-chrome can be easily manufactured directly from chromite in the electric furnace; second, the percentage of carbon in ferro-chrome can not be kept low by regulating the carbon charged without excessive loss of chromium in the slag; third, the percentage of carbon in the ferro-chrome must be regulated by decarburization with an oxide slag of iron or chromite after the slag from reduction has been tapped off; fourth, the proportions of silicon and phosphorus can not be kept low in the alloy under the strong reducing conditions necessary; fifth, sulphur can be easily slagged; sixth, as the addition of lime does not seem to aid in reducing phosphorus, it is advisable to use no lime but raw materials as pure as possible; and, seventh, the power consumption should not exceed 3.7 kilowatt-hours per pound of ferro-chrome tapped or 0.85 kilowatt-year per ton.

In the reduction of chromium from chromite to form ferro-chrome with the iron reduced, reduction of chromic acid begins at 1,185 degrees Cent. Reduction takes place according to the reaction:

$$FeO.Cr_2O_3+4C=Fe.2Cr+4CO$$

A pure chromite ore contains 68 per cent Cr_2O_3 and 32 per cent FeO. For reduction of pure chromite 30 parts of carbon are theoretically necessary for every 100 parts of iron and chromium reduced. In practice this amount is exceeded considerably. In ferro-chrome manufacture practically all of the reduction is performed by the solid carbon and not by carbon-monoxide gas. On the basis that the double carbide $Fe_3C.3Cr_3C_2$ forms in reduction with carbon as has been found to be the case, the reduction reaction is as follows:

$$9FeO.9Cr_2O_3+50C=[2(Fe_3C.3Cr_3C_2)+3Fe]+36CO$$

The ferro-chrome resulting would contain theoretically 10.4 per cent carbon, 31.4 per cent iron, and 58.2 per cent chromium. For reduction of 100 parts of this alloy 37 parts of carbon are necessary, the above reaction explaining the difference between the theoretical and the practical proportion of carbon necessary, if calculation is made on the assumption that the double carbide is not formed.

Reducing With Silicon

Several United States patents have been issued for the reduction of metallic oxides by the use of silicon as a reducing agent. The reaction is as follows:

$$2FeO.2Cr_2O_3+4Si=2Fe.4Cr+4SiO_2$$

Thus for the reduction of 100 parts of ferro-chrome containing 65 per cent chromium, 35 parts of silicon are necessary. In United States patents granted to F. M. Becket based on this reaction it is claimed that a ferro-chrome with a silicon content as low as 0.01 per cent or less can be made by this method, although this possibility is not shown in the researches of Neumann with the silicon percentage of the alloy high. Patents based on about the same reaction, with ferro-silicon as a reducing agent have been granted to E. F. Price. These processes are expensive, the silicon content in the alloy tends to be high, and as a result they are not widely used in actual manufacture.

Decarburization of high-grade ferro-chrome is accomplished by melting the alloy with a slag of lime, chromite ore, and a little fluorspar, according to the following reaction:

$$2\,[2(Fe_3C.3Cr_3C_2)+3Fe]+7FeO.7Cr_2O_3=25Fe.Cr_2+28CO.$$

For each 100 parts of completely decarburized alloy 39 parts of pure chromite ore are necessary, or for each 100 parts of ferro-chrome containing 10.6 per cent carbon, 31.3 per cent iron, and 58.1 per cent chromium, 36 parts of pure chromite ore are necessary for complete decarburization. The resulting alloy would contain 66.6 per cent chromium and 33.4 per cent iron. In practice the lime is added simply to flux any silica in the ore, to assist in elimination of silicon in the ferro-chrome, and to cause possible removal of carbon as calcium carbide, as the operation is performed in an arc furnace. The fluorspar makes the slag more fluid.

Table II.

DETAILS OF EXPERIMENTS IN THE PRODUCTION OF FERRO-CHROME DIRECTLY FROM ORE

Experiment No.	1	2	3	4	5	6							7	
Charge:						a	b	c	d	e	f	a	b	c
Chromite, pounds	10.00	10.00	10.00	10.00	10.00			60.00					40.00	
Coke, pounds	1.87	1.87	1.87	1.63	1.36			11.23					8.10	
Lime, pounds	1.25	1.25	1.25	1.25	1.25			6.70					4.50	
Fluorspar, pounds	0.12	0.12	0.12	0.12	0.12			0.68					0.44	
Constituents of alloy product:														
Chromium, per cent.	51.80	48.60	49.70	52.70	57.10	50.69	68.20	58.90	56.10	68.00	67.10	62.60	72.70	68.00
Carbon, per cent.	10.05	8.74	11.50	3.72	9.28	6.50	9.31	8.72	7.89	4.32	7.40	5.28	8.32	5.43
Silicon, per cent.	0.81	1.10	1.26	0.87	0.35	0.67	0.60	1.23	1.25	0.96	1.03	0.79	0.56	0.94
Phosphorus, per cent.	0.128	0.133	0.110	0.106	0.120	0.106	0.099	0.108	0.119	0.106	0.106	0.121	0.119	0.104
Sulphur, per cent.	0.073	0.038	0.096	0.061	0.085	0.071	0.105	0.055	0.016	0.031	0.054	0.020	0.023	0.027
Slag, Cr_2O_3, per cent.	8.03	7.57	6.96	8.98	8.81	9.15	12.60	10.72	13.43	13.13	13.34	8.78	11.40	11.35
Slag, SiO_2, per cent.	23.40	24.60	23.40	20.25	26.60	32.60	34.20	29.20	28.00	28.90	28.00	36.84	30.50	29.40
Slag, FeO	9.02	7.29	18.96	15.10	10.17	6.10	14.82	15.43	14.81	15.17	17.55	8.73	16.99	18.10
Calculated percentage of chromium	65.50	65.50	65.50	65.50	65.50			65.50					65.50	
Carbon per pound of iron and chromium, pounds	0.312	0.312	0.312	0.271	0.228			0.312					0.418	
Calculated weight, pounds	4.45	4.00	4.47	3.87	5.06			29.30					19.40	
Ferro-chrome tapped, pounds	3.50	4.87	5.15	2.44	2.66	2.66	2.13	3.21	3.21	3.21	3.50	1.50	2.51	7.00
Ferro-chr. tapped, per cent	78.50	89.90	86.30	62.95	53.30			*61.8					†66.80	
Electrode consumption per ton tapped, pounds	210.00	150.00	142.00	204.00	189.00			48.1					16.30	
Power consump. per lb. of alloy tapped, kw. hours	3.18	2.73	2.57	6.38	4.71			3.02					3.53	
Power consump. per ton of alloy tapped, kw. years	0.73	0.62	0.59	1.46	1.08			0.69					0.81	

*Total, 17.92 pounds.
†11.01 pounds.

Gin claims that high temperature is not necessary for decarburizing, but his contention is not sustained in practice.

Until the introduction of the electric furnace in 1899 ferro-chrome was manufactured entirely in either the crucible or the blast furnace. The crucible was used only for the production of the higher grades, chromite being reduced with charcoal, and a flux of lime, borax, fluorspar, or water glass being used. In the blast furnace chromite is reduced with some difficulty, with the high fuel consumption of about 3 tons of coal or coke to 1 ton of ferro-chrome produced. Theoretically, it should be possible to get a ferro-chrome containing 65 per cent chromium from ore containing 60 per cent Cr_2O_3 and 20 per cent FeO, but generally a ferro-chrome containing 30 to 40 per cent chromium and 6 to 12 per cent carbon is the product in the blast furnace. Little ferro-chrome is now made by either the crucible or the blast furnace, because it can be made cheaper in the electric furnace in localities where electric power is cheap. A small amount of carbon-free ferro-chrome is now made by the thermit process.

The greater part of the ores now used in the electric furnace manufacture of ferro-chrome come from Turkey, New Caledonia, Cuba, and New South Wales. There are considerable deposits of chromite ore in Canada and California, but they are so far from the market that the production does not amount to much. The analyses of some of the ores are given below:

Component.	Source of ore. Turkey. Per cent.	New Caledonia. Per cent.	California. Per cent.	Cuba. Per cent.
Cr_2O_3	51.7	55.7	52.68	50.0
FeO	14.2	13.2	15.30	18.57
Al_2O_3	14.1	16.2	11.40	12.44
MgO	14.3	9.8	16.23	13.38
SiO_2	3.5	.2	3.40	3.82
CaO	1.7	.25	.....	2.16
H_2O	.3	1.05	.94	.....
MnO	....	.2	.15	.....
P_2O_5	....	.05	.....	.45
S	....	.....	.....	.69

The foreign manufacturers use only chromite containing less than 0.1 per cent phosphorus and sulphur and about 50 per cent Cr_2O_3. They use no lime in the charge, as it has been found preferable by them to use pure materials and keep the amount of slag as low as possible. In most plants high-grade anthracite coal is used as the reducing agent. The only American manufacturers of ferro-chrome, according to their patent specifications, use a lime slag. They sometimes use Cuban ore, which contains considerable phosphorus and sulphur. Coke or charcoal may be used instead of anthracite coal, but the latter is better, as it may be obtained in a more finely pulverized state, a form in which it makes a more intimate contact with the chromite, and consequently produces a better reduction. As the electric furnaces have not a high shaft it is not necessary to use a reducing material of high compressive strength.

There are several types of electric furnace used in the manufacture of ferro-chrome. All are constructed on the principle of the Siemens crucible with a conducting hearth, or are similar to the Heroult steel furnace with vertical electrodes in series. In a conducting-hearth furnace the lining of the walls may be of chromite or, more commonly, magnesite or dolomite tar mixture, with a carbon block in the bottom; or, as in the Girod furnace, it may have a conducting hearth of iron rods buried in the refractory bottom; or, as in the Siemens furnace, it may have a non-conducting hearth in which the lining of the hearth and walls is entirely of a non-carbon refractory, such as dolomite, magnesite, or chromite. The walls are thin, not over 9 inches thick, but the electrodes are far enough from them to allow the molten charge to freeze on the walls and thus form a highly refractory lining. Some furnaces were water cooled at first to assist this result, but few are now so constructed. Ferro-chrome freezes to a certain extent on the bottom, so that molten metal does not have so much chance to contact with the carbon bottom. The process of manufacturing ferro-chrome consists of mixing a charge of chromite and anthracite coal in proportions based upon the theoretical calculations given. The charge is shoveled into the open top of the furnace and around the electrodes. The furnace is charged at regular intervals so as to keep the top in an unfused condition. The ore is finely powdered, but the coal is about in the condition it comes from the mine.

There is some loss of ore that is carried off with the gases that escape at the top of the furnace. At intervals of two to four hours the ferro-chrome is tapped off from the bottom into iron pots set on cars, from which it and any slag are dumped when solid. The slag and metal come out of the same tap hole. When cool the metal is broken with hammers to separate it from the slag, and is packed into kegs or boxes. In tapping an iron rod is used to open up the tap hole, which is plugged with fire clay.

Ferro-chrome manufacture is carried on continuously, in some cases for two years, before the furnace is shut down for repairs. Ferro-chrome containing as low as 5 per cent carbon can be made economically when produced directly from ore in one operation. It has been possible to produce an alloy containing as low as 2 per cent carbon in one operation, but great care in regulation of the charge and operation of the furnace is necessary. The slags from the average ferro-chrome furnace making a 5 per cent carbon alloy run from 0.5 to 1 per cent Cr_2O_3.

The refining of the high-carbon grades of ferro-chrome is done in an arc furnace where the alloy is subjected to a prolonged heating with a slag of chromite, lime and fluorspar, proportioned to the amount of carbon and silicon to be removed and the silica that must be fluxed in the chromite used. The ferro-chrome covered by this slag is heated at a high temperature for a length of time dependent on the carbon in the alloy. The resulting slag contains about 25 per cent Cr_2O_3 and is ground up and sent through the smelting furnace again, so that there is not much loss of chromium. By this method it is possible to reduce the carbon from 10 to 0.25 per cent, but the more usual low-carbon grade contains 0.5 per cent carbon. The percentage of carbon in the ferro-chrome varies from 9.5 to 0.6 per cent carbon, but the iron increases with the decrease of carbon. This would seem to show that in refining, the iron oxide of the chromite is first reduced, the chromic oxide merely serving to keep a slag with excess chromium, thus preventing any final lowering of the percentage of chromium in the alloy.

Table III.

ANALYSES OF TYPICAL FERRO-CHROMES.

Component.	Crucible. Per cent.	Blast furnace. Per cent.	Electric furnace: With 8 to 10 per cent carbon. Per cent.	With 7 to 8 per cent carbon. Per cent.	With 5 to 6 per cent carbon. Per cent.	With 3 to 4 per cent carbon. Per cent.	With 1 per cent carbon. Per cent.
Chromium	19.8	41.39	64.5	63.5	64.0	64.0	63.5
Iron	.....	.....	22.0	21.5	28.5	31.0	35.0
Carbon	3.8	7.12	9.5	7.5	5.5	3.5	.6
Silicon	.....	.21	2.25	5.8	.4	.3	.2
Aluminum	.....	.....	.80	.8	.5	.4	.10
Manganese	.33	1.84	.15	.15	.15	.15	.10
Calcium	.....	.....	.25	.25	.25	.30	.35
Sulphur	.....	.....	.04	.04	.04	.04	.03
Phosphorus	.....	.052	.03	.03	.03	.02	.02

As the carbon is oxidized so is the silicon until the content is as low as 0.2 per cent, as compared with 2 to 5 per cent in the crude alloy. Aluminum is also considerably eliminated and phosphorus and sulphur are reduced to a slight degree.

Processes based on the use of silicon or some reducing agent other than carbon have not been commercially successful because the cost of such reducing materials as silicon, ferro-silicon and aluminum is much higher than that of carbon. Also the products may be contaminated with the reducing material just as when carbon is used, so that a subsequent refining is necessary. Carbon-free ferro-chrome for high-grade steels has, however, been successfully made by the thermit process, but the amount made in this way is comparatively small. Analyses of various grades of ferro-chrome are given in Table III.

Power Consumption

The power consumption in a ferro-chrome furnace of the Meraker Electric Smelting Co., at Kopperaaen, Norway, was recently given as 3 kilowatt-hours per pound, or 0.68 kilowatt-year per short ton in making a ferro-chrome containing 5 per cent carbon. At Kanawha Falls, W. Va., ferro-chrome was made in a crucible electric-arc furnace with a power expenditure of 3.6 kilowatt-hours per pound, or 0.72 kilowatt-year per ton. This product contained 70.96 per cent chromium, 23.23 per cent iron, 5.21 per cent carbon, 0.5 per cent silicon, 0.008 per cent phosphorus, and 0.078 per cent sulphur. At both Kopperaaen and Kanawha Falls an ore containing about 50 per cent Cr_2O_3 was used. The Kopperaaen ferro-chrome contains 65 to 70 per cent chromium. In the experiments of the writer, a product containing 50 to 68 per cent chromium and 4.32 to 9.31 per cent carbon was obtained with an ore containing 46.35 per cent Cr_2O_3, and power consumption of 3.02 kilowatt-hours per pound or 0.69 kilowatt-year per ton. A 750-kilowatt furnace of the Albycarbide type at Kopperaaen, operating continuously, uses on the average about 3 kilowatt-hours per pound of ferro-chrome produced, or 0.68 kilowatt-year per short ton, when chromite ore containing 50 per cent Cr_2O_3 is charged; and the product contains 5 per cent or more of carbon and 65 per cent of chromium.

The electrode consumption in ferro-chrome manufacture depends somewhat on the proportion of carbon in the ferro-alloy being produced, as, if the carbon of the charge be materially reduced, the electrode will be oxidized by the charge. With an open-top furnace the consumption varies from 50 to 100 pounds per short ton of ferro-chrome produced. As most of the ferro-chrome furnaces do not use continuously feeding electrodes this item will probably be kept at a much lower figure in the future. At present in many plants one-half to one-third of the electrode is not used, and, unless the works has its own electrode plant in which stumps can be made into new electrodes, this is lost so far as its electrode value is concerned. Aside from the electrode item, the repair and up-keep cost on a ferro-chrome furnace is not high. The linings last one to three years without repair.

In Table IV estimates are made of the cost of manufacture of a ferro-chrome containing 60 per cent chromium and 8 to 10 per cent carbon from chromite ore containing 50 per cent Cr_2O_3. The power figures and other data were gathered by the writer in Europe and the United States during the past year. The calculations are on the basis of two 750-kilowatt furnaces turning out a total of 6 tons of ferro-chrome per 24 hours. The Norwegian plant is within 60 miles, the French plant within 200 miles, and the American plant assumed to be within 100 miles of seaboard. Labor conditions are considered to be as found in the various countries.

Table IV.

COST OF PRODUCTION OF FERRO-CHROME PER NET TON.

Item.	Norway. Cost of unit.	Norway. Total cost.	France. Cost of unit.	France. Total cost.	United States. Cost of unit.	United States. Total cost.
3,000 pounds of chromite	$15.00	$20.50	$15.00	$22.50	$15.00	$22.50
500 pounds of coal	5.00	1.25	6.00	1.50	5.00	1.25
50 pounds of carbon electrodes	.04	2.00	.03	1.50	.04	2.00
0.68 kilowatt-year	8.30	5.65	18.66	12.70	26.66	17.65
Labor	*1.00	8.33	* .80	6.66	*1.50	16.60
Repairs	....	4.00	....	4.00	....	4.00
Amortization and depreciation at 5 per cent each	....	2.50	....	2.50	....	2.50
Interest on $50,000 at 6 per cent.	....	1.50	....	1.50	....	1.50
General and packing	....	4.00	....	4.00	....	4.00
Total	....	$1.73	....	56.86	....	72.00

*Minimum for eight hours.

The figures indicate that it costs $20.27, or 39.2 per cent, more to manufacture ferro-chrome in the United States than in Norway. This increase is due to the higher price of power and increased labor cost here. The cheapest figure at which power can be obtained now in the eastern United States is $26.66 per kilowatt-year for electro-metallurgical purposes. The duty on ferro-chrome is 15 per cent ad valorem. The 8 to 10 per cent grade sells for $110 to $130 per short ton.

Ferro-chrome is used extensively in the manufacture of steel for armor plates, armor-piercing projectiles, wire, bullet-proof steel, tool steel, high-speed steel, high-grade castings, stamp-mill shoes and dies, safe steel, tires, axles, springs, razors, files and cutlery steel, and for many other purposes. As shown in Table III, electric furnace ferro-chrome is made in five grades, of which those containing 4 per cent carbon are classed as refined, the carbon in the others being regulated in the charge to a certain extent.

Ferro-chromes containing less than 2 per cent carbon are used in the manufacture of tool steels and high-speed steels. The alloy containing 3 to 4 per cent chromium is used principally in the manufacture of steel castings. For general open-hearth casting ferro-chrome containing 4 to 6 per cent of carbon is used.

For the manufacture of armor plate and projectiles, the high-carbon ferro-chromes containing 8 to 9 per cent carbon are generally used. This alloy is much cheaper and also its use is advisable for armor plate, because the carbon must be added at some time to harden the steel. A ferro-chrome containing a high proportion of carbon used in the open-hearth furnace will give a yield much superior to that containing a low proportion of carbon, because if the metal is still slightly oxidized, the oxide will act on the carbon rather than on the chromium. For the purpose of protecting the chromium from oxidation, armor-plate manufacturers use a ferro-chrome that contains a high percentage (4 to 5 per cent) of silicon. In this way the oxides act on the silicon before they act on the chromium.

The distinguishing feature of chrome steels is their great hardness. Chrome steels usually contain 1 to 2 per cent chromium and 0.8 to 2 per cent carbon. Armor plate contains about 3.25 per cent nickel, 1.5 per cent chromium, and 0.25 per cent carbon. In armor plates the nickel and chromium are sometimes added in the form of a ferro-chrome-nickel containing 52 per cent chromium, 18 per cent nickel, 28.96 per cent iron, 0.5 per cent carbon, 0.5 per cent silicon, 0.03 per cent sulphur, and 0.01 per cent phosphorus.

Heroult Furnaces for Foundry Use

Details of Three Phase Electric Furnaces Designed for Melting Crucible Steel for Castings, With Special Reference to Installation at Lebanon, Pa.

COMPARED with other steel-making processes, the adoption of the electric furnace has been rapid and widespread. Now that the metallurgical features of the electric process have been worked out, increasing attention at present is being given to furnace design to meet special requirements. Recently a new design for Heroult electric furnaces of small size has been developed. Furnaces of this character may be used to take the place of crucible furnaces in plants manufacturing steel by the crucible process where the nature of the product requires that the metal be poured from shanks or hand ladles.

A furnace of this design recently has been placed in operation at the plant of the Lebanon Steel Foundry, Lebanon, Pa., and another of larger size has begun operation at the plant of the Electric Steel Company of Indiana, Indianapolis, Ind.

The furnace of the Lebanon Steel Foundry is of one-ton capacity, with a maximum demand of 250 kilowatts and is supplied with 3-phase, 60-cycle, alternating current at 2,300 volts, which is stepped down to 100 volts across the line, giving approximately 45 volts at the arc. The power factor is 97 and an interesting feature is that the furnace load has brought up to 90 the power factor of the plant, which includes motors for a sand-mixing machine, air compressor, grinders, etc. The shanking of the heat from the furnace is accomplished successfully, and it is said the tilting is controlled so easily that it is possible to pour the entire heat into hand ladles without losing any of the metal. The automatic regulation enables the current to be left on until practically all of the metal has been poured from the furnace, although this is not necessary. The fluidity of the metal is such that it has been an easy matter to pour without difficulty the small castings usually produced by the crucible foundry.

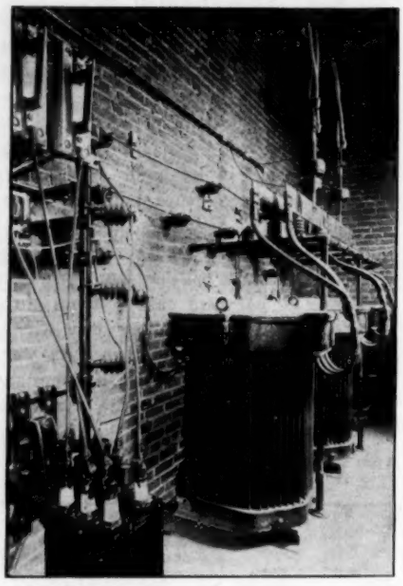


FIG. 1—TRANSFORMERS FOR HEROULT FURNACE

Heats of electric steel are being made with two slags in from three and a half to four hours. The two slags are being used for dephosphorizing, desulphurizing, deoxodizing and killing the metal, and faster time could be made by melting down with one slag. As this furnace, however, is displacing the crucible furnace, the aim in view is to produce steel fully equal to crucible steel. The results obtained tend to confirm the experience of past years that no great amount of trouble is involved in replacing crucible furnaces with the small electric furnace, and in continuing the established practice of the shop. Some of the advantages claimed for the electric furnace in the foundry are the long periods between the heats, during which time the men may keep consistently at their work, avoiding interruptions for pouring as in crucible practice. Also all of the foundry scrap may be returned to the furnace. The demand for low carbon steel in small castings can be more readily met as the result of

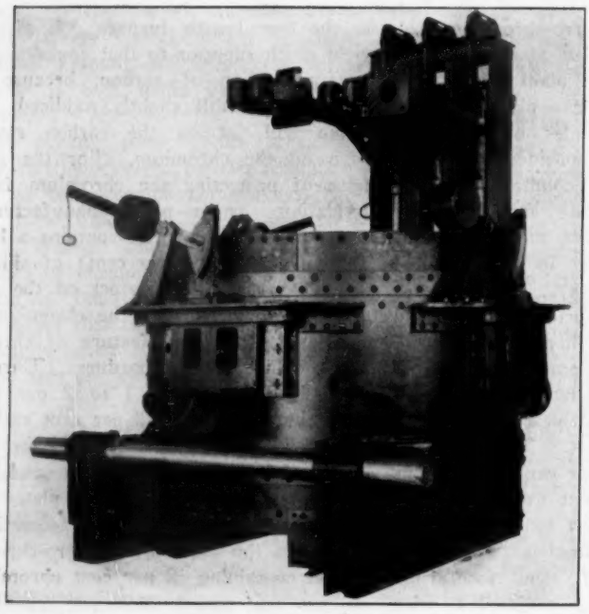


FIG. 2—SHELL OF ELECTRIC FURNACE OF THE 3-TON TYPE INSTALLED BY ELECTRIC STEEL CO., INDIANAPOLIS

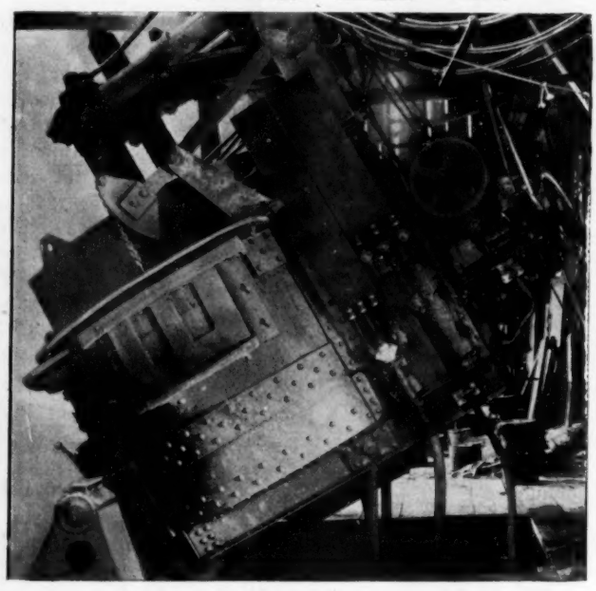


FIG. 3—ONE-TON FURNACE IN TILTED POSITION FOR POURING

the use of all of the scrap.

The accompanying illustrations show the features of the furnace. A shaft, Fig. 2, runs across the front of the furnace, immediately below the spout, and rests in pillow blocks, with the result that the spout is practically stationary during pouring. As it is necessary to lift almost the entire weight of the furnace, a counterweight has been provided. The counterweight box is filled with pig iron and is supported on levers which are attached to the furnace by connecting rods. A worm gear, driven by an electric motor, equipped with a magnetic brake, operates the tilting machinery. The magnetic brake makes it possible to stop the furnace at any point, even though the friction of the worm gear is insufficient. The tilting mechanism is so adjusted that it is possible to tilt it by hand. A feature of this design is that the connection between the main driving gear and the furnace is similar to a locomotive connecting rod so that in lifting or lowering the furnace the motor may be operated in either direction, and should the operator allow the mechanism to run past the high or low point, no damage results, and no automatic brakes or checks are required. If left to itself, with the current on, the mechanism would continue its reciprocating motion.

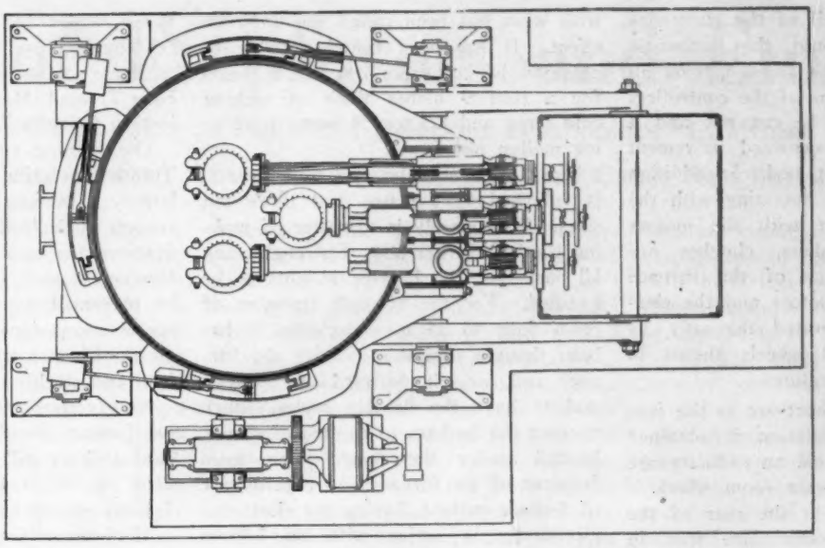


FIG. 4—PLAN VIEW OF FURNACE SHOWN IN FIGS. 5 AND 6

The amount of electric current consumed by the furnace is determined by the distance of the electrodes above the bath, which is approximately 1 inch. The resistance in the air gap between electrode and bath is increased or decreased by raising or lowering the electrode a small fraction of the total gap; this is done automatically. Although various designs of regulators may be employed for this purpose on the Lebanon furnace, the Thury automatic regulator is used. The special feature which distinguishes this regulator from others is that the impulses given to the motors which lift and lower the electrodes, are intermittent. A solenoid in series with the main line leading to the furnace, causes the regulator to make contacts which throw direct current into one or the other side of the operating motors. Thus the furnace is operated in accordance with its requirements for quantity of current, not voltage. Each impulse given by the regulator lowers or raises the electrode something less than 1/16-inch. By resistance in parallel with the solenoid on the regulator, the regulator can be made to give the furnace any predetermined quantity of current. Although to bring the load up to a certain point, a number of impulses may be required, there is a check between each movement. Consequently if a boil in the furnace, or the sudden movement of a piece of scrap causes a sudden reversal of conditions, the regulation is extremely accurate as the electrode is not floating between high and low points.

The switchboard panel is situated at right angles to the wall to which the regulators are attached, so that the operator can view the instruments while putting on or adjusting the load, and can note just how many kilowatts he has on each phase.

In conjunction with the regulators, there are three controllers, by means of

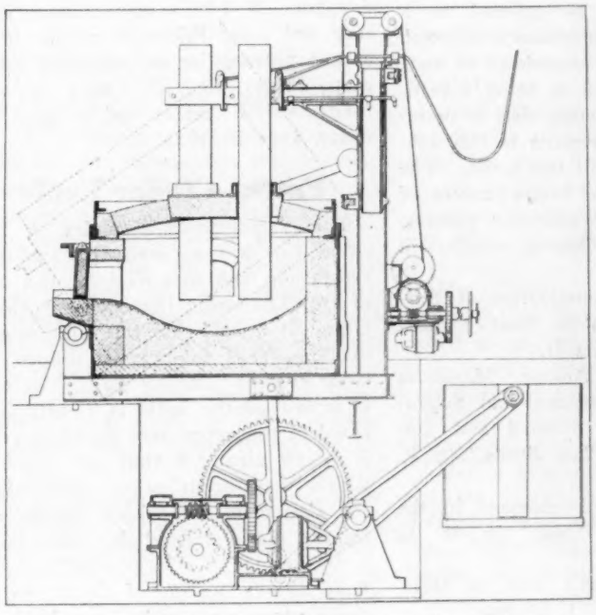


FIG. 5—ELEVATION OF HEROULT FURNACE FOR FOUNDRY SERVICE

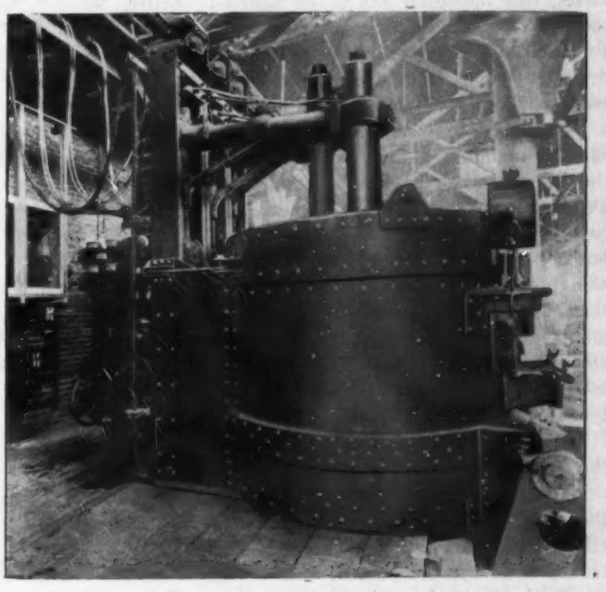


FIG. 6—ONE-TON FURNACE SHOWING ELECTRODES AND OPERATING MECHANISM

which any one or all of the electrodes may be thrown onto the automatic regulation, or may be stopped from all movement. By means of the controllers the regulators may be cut out and a rapid upward or downward movement of the electrodes obtained. In addition to the possibility of operating with the regulators, or direct with the motors through the controllers, clutches are provided at the back of the furnace which cut out the motors and the electrodes may be operated manually by means of the hand wheels shown in accompanying illustrations.

To maintain the short arc in the furnace, automatic regulation is obtained in the same way as in an ordinary arc lamp. The transformer room which is of brick is located at the rear of the furnace, and the cables are lead in overhead.

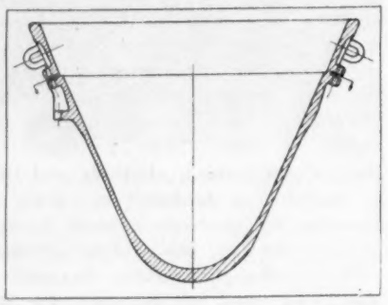
The superstructure for supporting the electrodes gives added strength to the furnace, and is so spaced as to allow for proper radiation from the shell. The cranes for supporting the electrode holders are adjustable in all directions giving a desirable flexibility. The electrode holders are opened and closed by means of a right and left screw to provide for the easy slipping of electrodes. These, as well as the electrode coolers on the roof of the furnace, are water cooled. The roof as usual is built in a removable ring.

The electrodes, three in number, are of amorphous carbon, 8 inches in diameter, and, as usual, are threaded to provide for continuous feeding. The three electrodes are to take care of the three phases.

While it is believed desirable to increase the power input and hasten the melting time to reduce the radiation losses, this operation has to be handled carefully. The refining operation is a function of time only and it is a desirable thing from the power standpoint to keep the maximum demand at a reasonably low point. It is necessary to maintain a low voltage so that the short arc can be retained, and it is also of importance not to increase the cost of transformers, copper cables, busbars and electrodes beyond a reasonable point. It is thought by engineers that there is a mean between these points which will give the greatest efficiency and it appears that 250 kilowatts on a one-ton furnace of this type about fulfills the requirements.

The advantages of a short arc and the amorphous carbon electrodes, are said to be found in the application of the heat at the point where it can do effective work. The tendency of electrodes is to become pointed, due to the oxidization, and for this reason a large electrode is desirable and the arc playing about its surface is held to the bath with what has been called the umbrella effect. It has been found possible to obtain a life of from 200 to 250 heats for a roof 9 inches thick in melting cold scrap and 125 to 150 heats in refining molten metal.

The design for the one ton furnace, is followed in the two and three ton sizes. This merely is a matter of making the bath larger and of strengthening all parts for the heavier weights to be handled. For the Heroult furnaces of from four to 15 tons capacity, it has been thought desirable to have the furnace roll, or tilt forward on rockers, and to have the flexible cables, which connect the busbars to the transformers, located under the floor. The main features of all furnaces as regards use of 3-phase current, having the electrodes electrically in series with no bottom connections, and controlling the arcs automatically, are retained in accordance with the ideas of Doctor Heroult.



THOMPSON-JONES PATENT CINDER LADLE

Testing Society Meeting

At the eighteenth annual meeting of the American Society for Testing Materials, to be held at the Hotel Traymore, Atlantic City, June 22 to 26, one entire session will be devoted to a discussion of the heat-treatment of steel. This practice now is considered of such great importance and is being investigated to such an extent that a prominent place has been given to this subject on the program of this society. The session devoted to the heat-treatment of steel will be held Wednesday evening, June 23, and the following papers will be presented:

"Micrographic Determination of Surface Decarburization in Heat-Treated Steels," by J. G. Ayers Jr.

"The Relations Among Maximum Strength, Brinell Hardness and Scleroscope Hardness in Treated and Untreated Alloy and Plain Steels," by R. R. Abbott.

"Some Neglected Phenomena in the Heat-Treatment of Steel," by M. E. Leeds.

"The Charpy Impact Test on Heat-Treated Steel," by J. J. Thomas.

"Comparison of Physical Properties Obtained from Carbon Forging Steel When Water and Oil Quenched," by C. D. Young.

"Some Reasons Why the Use of Heat-Treated Material Has Been Subject to Criticism," by H. V. Wille.

The opening meeting is scheduled for Tuesday morning and will be devoted largely to a consideration of committee reports, principally on standard specifications for coal and coke. At the afternoon session committee reports will be presented as follows: On standard specifications for wrought iron, cast iron and finished castings and corrosion of iron and steel.

Non-ferrous metals will be discussed on Tuesday evening, when also the annual address will be delivered by President A. W. Gibbs. Papers on non-ferrous metals include the following:

"Fatigue of Copper Alloys," by Ernst Jonson.

"Molten Zinc as a Reagent for Etching in the Microscopic Examination of Steel," by Jesse L. Jones.

"Battery Zincs—Some Causes of Defective Service," by Robert Job and F. F. White.

"The Determination of Spelter Coating on Sheets and Wire," by J. A. Aupperle.

On Wednesday morning committee reports will be presented on standard specifications for steel, cold-drawn steel and methods of testing. Two papers also will be presented as follows: "Elastic Limit," by T. D. Lynch, and "The Elastic Limit of Steel Determined by Transverse Test and Its Relation to the Tensile Elastic Limit," by W. K. Shepard.

Other topics to be discussed at the sessions indicated follow:

Testing apparatus, Thursday, June 24, 10:00 a. m.; cement and concrete, Thursday, June 24, 3:00 p. m.; ceramics, gypsum and lime, Friday, June 25, 10:00 a. m.; preservative coatings and lubricants, Friday, June 25, 3:00 p. m., and road materials, timber and rubber, Saturday, June 26, 10:00 a. m.

Patent Cinder Ladle

The Youngstown Foundry & Machine Co. has secured the exclusive rights for the manufacture and sale of the Thompson-Jones patent cinder ladle. It is said that this ladle is self-skulling, thus tending to reduce the labor cost of handling slag. The construction of the ladle is clearly indicated in the accompanying illustration. It is so arranged that any cracking which may occur takes place above the cinder line or where the ladle is thinest. It is claimed that these ladles in the service of a large steel company have shown a life of from two to three years on a very long haul, the number of trips ranging from 1,200 to 2,300 per ladle.

News of Employers and Employes

Work of Commission on Industrial Relations Disappoints—Chairman Walsh's Antagonistic Attitude Toward Capital May Cause Resignation

Washington, May 11.—So indecorous has become the conduct of Chairman Frank P. Walsh, of the United States commission on industrial relations, that prominent Democratic politicians, close to the White House, who had thought the commission would be an agency for good, are now firmly convinced that the commission, if guided by Mr. Walsh's plans and views, has lost its usefulness. Moreover, they maintain its conclusions, which will have to be reached before long, as the commission expires in August, will be of little, if any help. From the time the commission was created, there was a wide belief that it could not accomplish much in the way of developing concrete causes of "industrial unrest", the one big question it was selected to investigate. But if there were any chance to work out a solution through the commission, it is felt that Mr. Walsh's bitterly antagonistic position toward capital has hopelessly ruined such an opportunity.

No one has questioned Mr. Walsh's sincerity, but his lack of balance, causing him to give way to vigorous outbursts, are taken to have completely unfitted him for the position he occupies, which, it is contended, requires one of a temperament far different from that possessed by Mr. Walsh. It is not thought that Mr. Walsh means to be unfair to representatives of big interests, but that he is, appears to be the general view. The White House apparently is of that mind.

Walsh May Resign

The difference between President Wilson and Chairman Walsh which developed last week is offered as substantial proof of this assertion, and considerable speculation is manifest as to whether this difference will widen into an open breach resulting in the immediate resignation of Mr. Walsh. The latter, who is both financially and temperamently independent, has remained silent as to the White House attitude, thus showing a rare instance of poise. But that Mr. Walsh is ready to quit, if he is to be denied the chance of speaking his mind openly, regardless of his official position, is seemingly evident.

The attitude of the President toward the commission, or rather Mr. Walsh, for the latter easily dominates the so-called investigations, was denoted when the White House refused to furnish the commission with copies of correspondence with former Gov. Ammons, of Colorado, on the Colorado coal strike. It was explained at the White House that the President did not care to take any part in the controversy between Chairman Walsh and John D. Rockefeller Jr., over the suggestion that an agent of Mr. Rockefeller had written a letter to the President for Gov. Ammons to sign.

President Wilson's refusal to give to the commission copies of the correspondence between himself and former Gov. Ammons is accepted as a direct rebuke to Mr. Walsh and his tactics. It is known that the letters contain nothing that would injure anybody, but the President is represented as being greatly displeased with the methods employed on the commission, and does not propose, it is said, to lend his name and influence to attempts to anybody or any cause in the newspapers in advance of the bringing out of the facts.

The letters from Gov. Ammons, it is asserted, would not in any way uphold what are termed apparent efforts of some members of the commission to attempt to prove that the governor's stand and his ideas throughout were really dictated by agents of Mr. Rockefeller.

High officials of the administration are of the opinion that if Mr. Walsh knows anything detrimental to Mr. Rockefeller's course he ought to bring the facts out through witnesses, and not attempt to persecute anybody by suggestions and intimations copiously used in the newspapers. It was stated that the President is not favorable to trials of persons before the public without testimony, and is declared not to relish Mr. Walsh's tendencies in the least.

Mr. Walsh is said to have told friends that he did not ask for his position on the commission, and does not "care a fig about the job". It is not believed the President, in view of the short time the commission continues its existence, will remove Mr. Walsh. Whether he would if the commission had a long period of work before it is a question. On the other hand, Mr. Walsh has not so far taken steps to eliminate himself from the commission.

His attitude toward men representing capital appears to progress in its heckling qualities. This seemed to be emphasized in comparing the hearings held here last year by the commission and those it began the forepart of last week, to last about two weeks more. The kinds of questions and the manner of formulating them which he put to such men as Robert T. Lincoln, chairman of the board of directors of the Pullman Co.; W. W. Atterbury, vice president of the Pennsylvania, and S. C. Long, general manager of that road, appeared in many cases to be in the nature of voluntary taunts, rather than queries aimed for constructive responses. On the other hand questions put to representatives of organized labor were couched in mild and the most favorable terms to bring out the union position. However, that did not prevent the development of a breach within union ranks.

Union Labor at Swords' Points

The feeling of W. H. Pierce, of the brotherhood of federated railroad employes, was too strong to prevent his venting his dislike for W. G. Lee, president of the brotherhood of railroad trainmen. Mr. Pierce called Mr. Lee a traitor. Mr. Pierce said Mr. Lee had violated an alleged promise to Pennsylvania shopmen at Harrisburg and Altoona, Pa., to stand by them when they struck. When the crisis came, according to Mr. Pierce, the shopmen were deserted by Mr. Lee.

Some wonder has been expressed as to whether this row within union ranks will cause any serious break with one contingent lined up against the other. Commissioner Aishton, vice president of the Chicago & North-Western, insisted Mr. Lee should be given the right to reply to Mr. Pierce.

Labor and law, the topics scheduled for all this week, will be discussed by such prominent men as former President Taft and Judge Alton B. Parker, according to present plans. Their views will be listened to with considerable interest, although it seems doubtful that they will enunciate any new policies. That is one of the great criticisms of the commission. It is maintained the problem it has under way has existed since the creation of the universe, is partly a delusion and at its best must be worked out directly through intercourse between employer and employe rather than accumulation of a mass of old

News of Employers and Employes

Interesting Statistics on Unemployed in New York City—Summary of Labor Legislation Throughout Country in 1914

ideas and recommendations to congress. For one thing, the commission has apparently not developed a political propaganda. Yet it is seen how it might easily do so unconsciously. Organized labor, it is claimed, could find it convenient to take umbrage at the position of President Wilson in refusing to give the commission the Ammons letters. The President, it is asserted, has lost the regard of at least an element of organized labor. His position with regard to retaining Charles Nagel, former secretary of commerce and labor, on the arbitration board which settled the western railroad strike, has antagonized many union men. Strong protests were sent to the President just before and after the board announced its findings that he should remove Mr. Nagel, who, in the estimation of the unions, was unfitted for the position merely because he held securities of the Busch railroad interests in St. Louis. The President pointed out that the protestants knew all along that Mr. Nagel held the securities, and he made it plain he saw no reason whatever for the removal of Mr. Nagel and remained firm in that position.

It is asserted that such things as these are among the more important causing the so-called industrial unrest, and they are aired fully by the commission.

New York's Unemployed

The bureau of labor statistics of the United States department of labor has just published as Bulletin No. 172 a report on unemployment in New York City. The report is based on information obtained from a census of 104 city blocks, located in various sections of the city, carefully selected with the purpose of including a representative number of families of the various nationalities and all classes of industrial workers, combined with a census of all families in 3,703 individual tenement houses and residences, covering a still wider range of distribution. The figures obtained have been used as a basis for estimating the number unemployed in the city.

The enumeration was made in the first half of February, 1915, and therefore shows conditions of unemployment at that time. Information was obtained from 54,849 families having a total membership of 229,428 persons, of which number 95,443 were wage earners. Of these families, 11,723 had one or more wage earners out of work, showing an aggregate of 15,417 persons, or 16.2 per cent of all wage earners in these families without employment of any kind. The total number of wage earners in New York City in 1915, estimated on the basis adopted by the bureau of the census, is approximately 2,455,000. The percentage of unemployment found among the members of 54,849 families visited (16.2) applied to this number shows that the total number of unemployed in Greater New York was about 398,000.

The above figures do not fully measure the amount of unemployment, for only those persons who had no employment whatever, regular or irregular, full-time or part-time, at the time of the agent's visit were recorded as unemployed.

A tabulation of the percentages of unemployment in each of several selected occupations, based on the estimated total number of wage earners in those occupations, shows the percentages of persons out of work to be as follows: Marble and stone cutters, 47.3 per cent; bricklayers and stonemasons, 32.5 per cent; carpenters, 25.9 per cent; painters and paperhangers, 43.9 per cent; plasterers, 37.1 per cent; plumbers, gas and steam fitters, 23.1 per cent; bakers, 16.3 per cent; longshoremen and stevedores, 16.2 per cent; machinists, 13.1 per cent; stenographers and typists, 7 per cent; and common laborers combined without regard to industry, 34.2 per cent, while the percentage of unemployment in all occupations other than those named above is 13.9 per cent.

Labor Legislation

Washington, May 11.—The bureau of labor statistics, department of labor, has just issued a bulletin giving a review of the annual summary of labor legislation in the United States. The summary is prepared by the bureau and appears as bulletin 166, of the bureau. It is asserted that on the whole there is a steady advance in 17 legislative bodies dealt with for the year 1914, as well as others "in the direction of better protective legislation for the classes of persons who are, as the Supreme Court has pointed out, in need of special legislation that their rights may be preserved, and on whom the future of the race depends."

The bulletin continues:

"Masculine interests were looked after in 1914 in laws requiring frequent wage payments by public-service corporations and the redemption of scrip or coupons in Mississippi, the weighing of coal before screening in Ohio, and regulating the work time of stationary firemen in Louisiana, and of workers in compressed air in New Jersey. A railroad full-crew law was enacted in Mississippi, and one was repealed by referendum in Missouri, these being the only states acting on this subject for the year. The state of Kentucky adopted a new mining code, and the Wisconsin industrial commission drew up a set of regulations for the protection of workmen engaged in building operations.

"The subject of workmen's compensation received attention from three or four legislatures by way of amending acts, while new laws were enacted in Kentucky, Louisiana and Maryland. In the last named state the law superseded an earlier enactment which had been entirely inoperative, while the Kentucky law was found constitutionally defective before the date when it was to come into operation."

Will Make Ferro-Silicon

A dispatch from Baltimore conveys the information that interests allied with the Pennsylvania Water & Power Co., have incorporated the Shaninigan Electro Products Co., capitalized at $250,000, to erect a plant at Baltimore for the manufacture of ferro-silicon and calcium carbide. These products will be made in electric furnaces and the output of the works, it is stated, will be 20,000 tons per annum. The ferro-silicon is to be made for the use of the steel industry. The electric power for the plant will be obtained from the Susquehanna hydro-electric plant of the Pennsylvania Water & Power Co. J. E. Aldred, chairman of the Pennsylvania Water & Power Co. and of the Consolidated Gas, Electric Light & Power Co., of Baltimore, is the prime mover of this proposition.

Business News of Nation's Capital

Sentiments of 300,000 Business Men Relative to American Merchant Marine Will Be Announced in Few Weeks—Argue Slag Disposal Tariffs

Washington, May 11. — With the European war causing the withdrawal of a tremendous oversea tonnage, emphasizing more than ever the need of an American merchant marine, unusual attention is being given to the outcome of a referendum being conducted on this subject by the chamber of commerce of the United States. All votes are to be in by June 22, according to an announcement made by the national chamber, and are to be cast by upwards of 600 chambers of commerce and national trade bodies throughout the country, representing some 300,000 business men.

Sentiment sounded at the last annual convention of the chamber in this city and which apparently continues to predominate indicates that the referendum will sustain the report of the chamber's special committee, comprised of William H. Douglas, New York, chairman; John A. Penton, Cleveland; Edwin J. Clapp, New York; Ludwig Nisson, New York, and H. A. Black, Galveston. Prof. Clapp, however, submitted a minority report, signed by himself only, in which he expressed the belief that the government ship purchase bill, then before the senate, was the most expedient solution for the present of the merchant marine problem.

The majority proposed that a federal shipping board should conduct an investigation, report to congress regarding navigation laws, and have full jurisdiction in all matters relating to oversea transportation. A marine development company, capitalized at $30,000,000, subscribed to by the government, would lend money to private interests for the purchase of vessels. It was also recommended that the ocean mail law of 1891 be amended by lowering the speed of steamers, and by making compensation adequate to permit the establishment of lines of mail and freight vessels.

The other ballot to be taken relates to the government purchase bill, government ownership of privately-operated vessels, subsidies to offset the difference in the cost of operating vessels under the American and foreign flags, and subventions to establish regular American mail and freight lines to countries in which the commercial interests of the United States are important, and to American dependencies.

If one-third of the voting strength of the national chamber has been recorded and two-thirds of the vote thus cast represent at least 20 states, the questions will be recorded as having passed one way or the other and the chamber will endorse accordingly. If, however, before the above mentioned time votes representing more than two-thirds of the voting strength of the organization membership are registered favorably or adversely to the propositions the results will thereupon be recorded by Elliot H. Goodwin, general secretary, as having the approval of the chamber.

Furnace Slag Disposal

Washington, May 11. — Arguments were made last Friday before the interstate commerce commission in the furnace slag case, in which the railroads propose to make a charge of 20 cents a ton for hauling the material from western Pennsylvania, eastern Ohio and points in West Virginia. Attorney Charles S. Belsterling, commerce counsel for the United States Steel Corporation, and Attorney Richard Jones Jr., representing independent steel companies of the Mahoning and Shenango valleys of Ohio and Pennsylvania, respectively, voiced protests against the tariff, while Attorney W. W. Collin appeared for the Pennsylvania and New York Central, and Attorney W. A. Parker for the Baltimore & Ohio.

The attorneys for the steel companies maintained that the tariff is unlawful, the commission is without jurisdiction, most of the slag traffic involved is of an intrastate nature, that it is of great benefit to the carriers, that it does not involve a transportation service and that the proposed charge is excessive. To these points the railroads entered a sweeping denial throughout.

Mr. Parker said that it is not a part of the common carrier's duty to dispose of what he termed waste materials, but that there is a commercial necessity for getting it away from the furnaces so that they may continue to operate. The railroads, he asserted, are interested in keeping the furnaces going, and therefore have published a tariff for "the wasting or disposal of slag, ashes, brick bats and other refuse material." While the railroads in the early days found use for slag, he said that today it is a burden to them to find a way to dispose of it.

Mr. Belsterling said that not only do the railroads find use for virtually all of the slag, but that the Pennsylvania railroad, the Pennsylvania Co., the New York Central, the Pittsburgh & Lake Erie, the Erie and the Baltimore & Ohio receive a net benefit of $335,645 annually from use of the slag.

Mr. Collin insisted that it costs the Pittsburgh & Lake Erie 49 cents a ton, the Pennsylvania 41 cents, the New York Central 69 cents, the Pennsylvania 47 cents, the B. & O. nearly 39 cents, and the Erie almost 40 cents to handle the slag. The net cost to the P. & L. E., he said, allowing credit for benefits from the slag, is 20.6 cents per ton. Asked by Commissioner Meyer if the railroads had ever thought of carrying the slag actually used by them as company material and carrying that for which they have no use on tariff rates specifically to cover such movements, Mr. Collin said:

"We fear that if tariffs of that kind were made, where an industry is served by two carriers, one, for traffic considerations, would say it could use much more than it really could and thereby save the industry expense and influence the routing of tonnage." Attorneys on both sides, as well as the commissioners, greeted this statement with a smile.

It was declared by Mr. Belsterling that, if the slag service is accessorial to the ore movement, the commission may, if it sees fit, direct the carriers to clearly state in the tariffs that set forth the single rate on the raw material to the furnaces any rule or regulation covering this particular accessorial service. He contended that transportation of slag is purely incidental to the use to which it is put and is not transportation within the meaning of the act to regulate commerce.

Mr. Jones strongly supported the claim that the traffic does not constitute commerce. It does not assume the aspect of commerce, he said, until a bill of lading is taken out and a contractual relation results between carrier and shipper. It is the practice not to ship slag through bills of lading.

"The tariff is a tariff published to nowhere," asserted Mr. Jones. The material becomes the property of the railroad, it was stated, as soon as it is

Business News of Nation's Capital

Take Action Relative to Securing Imports From Germany—Virginia Pig Iron Rate Case is Re-opened

loaded on cars at the industry. He pointed out that most of the traffic is of an intrastate nature, and that it is of great use to the railroads.

"The question of imposing a charge for the waste of slag," he asserted, "usually arises at the time of business depression in the steel industry, and is afterwards dropped when business conditions become normal in that industry." He pointed out that the subject has been agitated by the carriers since 1901. In closing he asked that the commission dismiss the proceedings for lack of jurisdiction.

Imports From Germany

Washington, May 11. — James F. Rose and William B. Fleming, trade advisers of the state department, have voluntarily undertaken to assist American importers in obtaining goods from Germany which were contracted for previous to March 1, the effective date of British order in council.

The order has been misunderstood generally and the circular issued by the state department for general distribution clears up the situation.

In part, the circular says:

On March 30, 1915, the government of the United States replied to the British Orders in Council assuming that the British government will not deny the rule that innocent shipments may be freely transported to and from the United States through neutral countries to belligerent territory without being subject to the penalties of contraband traffic or breach of blockade, much less of detention, requisition or confiscation, and that this would of course include all outward-bound traffic from the neutral country and all inward-bound traffic to the neutral country except contraband in transit to the enemy.

While the government of the United States can not in any way lend its aid in an official and formal manner to procuring American-owned goods now in Germany for the importers of the United States which would in the slightest degree amount to a recognition of the position of Great Britain in respect to non-contraband goods, especially from neutral ports, the office of the foreign trade advisers of the department will aid informally American importers who desire to present proof of ownership of American goods in Germany for which American importers claim to have made payment prior to March 1, 1915.

You are therefore advised that if you desire to submit proofs of your ownership of goods, paid for before March 1, for examination by the British embassy, you may forward such evidence as you have to the foreign trade advisers of the department of state. In doing so, it is suggested that you incorporate with the evidence of ownership and payment information in the following order:

1.—A history of the case, showing dates of payment, nature of the goods bought, location of goods at the present, date when they reached their present location, name of steamer on which it is desired to ship such goods, date of sailing of such steamer and all further information pertaining to origin, payment and shipment of goods in your possession.

2.—Original bank drafts or evidence of transfer of money from this country to belligerent country, verified by bank officials if possible.

3.—Invoices of goods and such other evidence as will prove the identity of the goods with those actually paid for.

4.—Such other and further information in regard to the shipment of goods and payment therefor as will be pertinent and corroborative.

This evidence will be collated and presented to the British embassy for communication to the British authorities. In presenting this evidence the foreign trade advisers will act unofficially as your representatives and with the understanding that in so doing the department does not recognize the position of the British government under article IV of the order in council of March 11, or any other article contained in the orders in council, but the unofficial aid of the foreign trade advisers is given merely to facilitate the shipments of American-owned goods of belligerent origin.

Virginia Rate Case

Washington, May 11. — Contention was made by railroad witnesses at the re-hearing in the Virginia pig iron rate case last week that reduced rates from Virginia now in effect, in accordance with the order of the interstate commerce commission, should be increased 5 per cent. It was further urged that the same advance should be made over proposed rates if reductions are decided upon. At the same time it was contended that additional reductions should not be made. These were the principal points brought out at the hearing and were developed by E. P. Bates, general freight agent for the Pennsylvania.

The Virginia case was re-opened upon a supplemental petition of Attorney Frank Lyon, representing Virginia furnace interests. The petition named as defendants all carriers involved in pig iron traffic from Virginia to New England, New York, Pennsylvania and other eastern points, to force them to meet the reductions made by carriers originally named defendants. The latter reduced rates to Boston, New York City, Philadelphia and Baltimore and intermediate points, but not to all grouping points, according to Mr. Lyon, and the proceeding was partly for the purpose of enforcing them to do this. Railroad witnesses maintained that the proposed deductions should be refused, but, if any are granted, they should not exceed, as a general thing, more than 15 cents per ton. Mr. Lyon asks for reductions ranging from 25 cents to 50 cents per ton.

Koppers Award

Youngstown Sheet and Tube Co. Places Contract for 204 By-Product Coke Ovens

The H. Koppers Co., Pittsburgh, has been awarded a contract for the erection of 204 by-product coke ovens for the Youngstown Sheet & Tube Co., Youngstown. The ovens will have a capacity of 12¼ tons each and will be designed for a coking period of from 15 to 18 hours. The battery will have a capacity of 2,240 tons of coke per day, and the fuel will be consumed by the four blast furnace stacks of the company. The tract on which the coke ovens will be built contains 40 acres, affording ample room for future increase in capacity if desired. The tract is situated almost directly across the Mahoning river from the blast furnace plant and a steel bridge will be erected to connect the two plants. The by-product coke plant will be designed for the addition of a benzol refining department, although equipment for the recovery of benzol will not be installed until the future market for this product is more certain. The contract will involve an expenditure of about $3,000,000. Provision for 102 additional ovens has been made. The plant will be completed 12 months hence.

As recently announced, the Koppers Co. has taken a contract to build 75 additional by-product coke ovens for the Republic Iron & Steel Co., Youngstown, which will increase the number of ovens at the Republic plant to 143. The battery, when completed, will have a capacity of 1,675 net tons of furnace coke per day. The battery will operate on 18 hours coking time.

Money and Iron: Fact and Comment

Sensational Declines Recorded by Industrial Stocks Following Sinking of Lusitania

Sensational declines were recorded in all industrial stocks following the announcement of the sinking of the Lusitania. The market reflected the grave consequences that might follow this act and but for the support of large financial interests still lower points would have been touched. Throughout the week the market reflected the possible refusal of China to grant the demands made by Japan and prices responded quickly to the varying reports of these negotiations. The so-called war stocks recorded advances early in the week, but following the report of the sinking of the Lusitania, the declines varied from 3 to 29 points. The successes scored by the German army almost throughout the entire week likewise had a depressing effect on quotations, although until the sinking of the Lusitania was reported the market displayed unusual resistance to bearish raids and indicated how widely stocks in the recent movement have been absorbed by the public.

Early in the week, Pressed Steel Car advanced on reports of large orders to be placed by the Russian government, and the Lackawanna Steel Co. secured a large contract for rails and track fastenings from this source. This was stated to be only the first of further similar orders that are to be placed with the rail mills of this country. The announcement of a slight decrease in the unfilled tonnage of the United States Steel Corporation on April 30 occasioned no surprise, as it was generally known that buying in April was hardly on a par with that of the preceding month. To this also must be added heavy shipments, as indicated by the increased operations of steel mills generally. The unfilled tonnage on April 30 on the books of the United States Steel Corporation was 4,162,244 tons, a decrease of 93,505 tons as compared with March 31. On the latter date, a decline of 89,622 tons also was reported.

Prudence and caution are two requisites which should be exercised as abnormal conditions prevail and large financial interests suggest cautious procedure until the outlook becomes clearer and the possibility of sudden and strange surprises no longer exists. Changes in the leading stocks identified with the iron and steel industry for the week ending May 8 are shown in the following table:

American Brake Shoe & Fdy. Co.	+ ¼
Amer. Brake Shoe & Fdy. Co., ctfs., prfd.	— ⅞
American Can	—11
American Can, prfd.	— 2⅞
American Car & Foundry Co.	— 6½
Amer. Car & Fdy. Co., prfd.	.....
American Locomotive	—13
American Locomotive, prfd.	— 2
American Steel Foundries	— 4¾
Baldwin Locomotive	—12¼
Baldwin Locomotive, prfd.	— 1½
Bethlehem Steel	— ⅝
Bethlehem Steel, prfd.	— ⅞
Colorado Fuel & Iron	— 6¼
Continental Can	— 2⅜
Continental Can, prfd.	— 1
General Electric	— 8¾
International Harvester of N. J.	— 5¾
Inter. Harv. Corp.	— 3
Inter. Harv. Corp., prfd.	.....
Nat'l Enameling & Stamping Co.	— 1¼
Nat'l Enameling & Stamp'g Co., prfd.	.....
Pressed Steel Car	—12¾
Pressed Steel Car, prfd.	— 1½
Pullman Palace Car	— 8¾
Republic Iron & Steel	— 5¼
Republic Iron & Steel, prfd.	— 4
U. S. Cast Iron Pipe & Fdy.	+ ⅛
U. S. Cast Iron Pipe & Fdy., prfd.	— ⅞
United States Steel	— 7½
United States Steel, prfd.	— 1¾
Westinghouse Mfg.	.....

Steel Foundries Report

The American Steel Foundries reports for the quarter ended March 31, 1915, net loss after all charges of $256,333, compared with a loss of $163,353 a year ago, and a profit of $386,872 two years ago. The income account compares as follows:

	1915.	1914.	1913.
Net loss from op.	†$89,763	$1,048	*$670,558
Oth. inc.	13,278	18,149	10,092
Total loss.....	$76,485	$17,102	$680,650
Chgs., skg. fd., bd. redeemp., etc.	179,848	180,455	293,778
Net loss	$256,333	$163,353	*$386,872

†After deducting manufacturing, selling, administration, and other expenses.
*Profit.

Nova Scotia Steel Report

The Nova Scotia Steel & Coal Co., New Glasgow, N. S., reports for the year ended Dec. 31, 1914, a deficit of $185,906, after bond and other interest, as against a surplus of $750,819 the previous year. Dividends on preferred stock amounting to $41,200 were paid during the year, as against $82,400 the previous year, and dividends on common amounting to $180,000 were paid, as against $360,000. After these payments a deficit of $620,419 is shown for 1914. The total surplus on Dec. 31, 1913, was $527,887, approximately $93,000 less than the deficit incurred during the ensuing year. To remedy this, $150,000 was transferred from the general reserve. The income accounts of the past two years compare as follows:

	1914.	1913.	1912.
Gross profit..	$415,164	$1,255,954	$1,000,610
Bd. & oth. int.	601,070	505,135	412,311
Deficit	$185,906	*$750,819	*$588,299
Oth. chgs. and approp.	213,313	233,132	201,843
Deficit	$399,219	*$517,687	*$386,456
Pfd. divs. ...	41,200	82,400	82,400
Deficit	$440,419	*$435,287	*$304,056
Com. divs....	180,000	360,000	360,000
Deficit	$620,419	*$75,287	$55,944
Prev. surp....	527,887	452,600	508,544
Tr. fr. gen. res.	150,000	.....	.....
P. & L. surp.	$57,466	$527,887	$452,600

*Surplus.

Allis-Chalmers Gains

The Allis-Chalmers Mfg. Co., Milwaukee, reports for the quarter ended March 31 last sales billed to the value of $2,017,712, and a net loss for the quarter of $8,915. For the quarter ended March 31, 1914, the company reported sales billed of $2,791,312 and a net loss of $65,697. Unfilled orders on hand March 31, 1915, were valued at $3,279,631. Sales and operating expenses for the three months compare as follows:

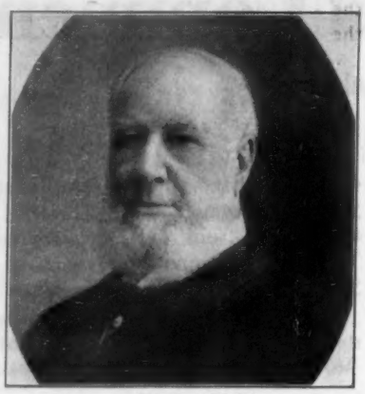
1915:	Sales billed.	Net loss.
January	$535,284	$44,716
February	652,998	14,666
March	829,429	*50,467
Total	$2,017,712	$8,915

*Profit.

Wyman & Gordon Reorganization

A reorganization is announced of the Wyman & Gordon Co., Worcester, Mass., and Cleveland, one of the largest forging concerns in the country, on account of the death of its president and treasurer, Lyman F. Gordon, which occurred at his home in Grafton, Mass., Dec. 20, 1914.

By the reorganization the capital stock is increased from $300,000 to $900,000 by the issue of $450,000 of 7 per cent cumulative preferred stock and $150,000 of common stock. The entire issue of preferred stock has



B. F. JONES

Bust of B. F. Jones for McKinley Memorial

Joseph G. Butler Jr., of Youngstown, president of the National McKinley Birthplace Memorial Association, announces that the Jones & Laughlin Steel Co. has subscribed $5,000 toward the building of the national McKinley birthplace memorial at Niles, O. "This," says Mr. Butler, "is the largest subscription we have received in response to the article printed in *The Iron Trade Review* of Feb. 11, describing the memorial."

While in Pittsburgh last week, Mr. Butler arranged with B. F. Jones Jr. to have a bronze bust of his honored father placed in the memorial building. The sculptor will be J. Massey Rhind, who is at work on the large statue of President McKinley to be placed in the front of the building. Mr. Rhind was the sculptor of the bust of the elder James Ward, and also that of Senator Hanna, both of which are completed.

been underwritten by Hayden, Stone & Co., of Boston, and a limited amount will be offered to the public by that firm.

All the stock owned by the estate of Lyman F. Gordon has been purchased by other interests, but the control of the company will remain with Worcester people.

George F. Fuller, who has been connected with the company for 27 years, and its general manager for 10 years, succeeds Mr. Gordon as president and treasurer. Harry G. Stoddard will continue as vice president and has been elected general manager. He has had charge of the Cleveland branch. Chas. C. Winn, who has had charge of the Worcester office for several years, becomes assistant treasurer and clerk.

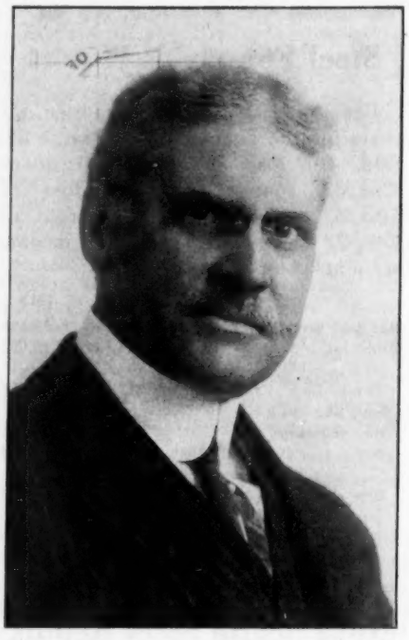
Charles M. Thayer, of the law firm of Thayer, Smith & Gaskill, of Worcester, has been elected a director of the company.

The business was started in 1883 by H. Winfield Wyman and Lyman F. Gordon, who employed 10 men. In 1901, the company was forced to erect a plant in Cleveland to properly take care of its western business. At present the company is running full time at its Worcester and Cleveland plants, employing 500 men, and has plans for extensive additions in Worcester.

Death of C. A. Plamondon

Charles A. Plamondon, president of the A. Plamondon Mfg. Co., Chicago, and one of the best known foundrymen in the middle west, was among those drowned when the Lusitania sank off the coast of England, Friday, May 7. The body of Mr. Plamondon has been recovered. Accompanied by his wife, he was en route to England on business.

Mr. Plamondon had been connected with the foundry business for many years, and 22 years ago became the first president of the Western Foundrymen's Association, the pioneer foundry organization in the Chicago district. He was chairman of the general committee which handled the arrangements for the 1913 convention of the American Foundrymen's Association, at Chicago, and much of



CHARLES A. PLAMONDON

the success of that meeting was due to his efforts.

The A. Plamondon Mfg. Co. was one of the first concerns in the country to manufacture power transmission machinery.

The offices of Crocker Bros., pig iron, coke and alloys brokers, have been moved from 1006 First National Bank building, Cincinnati, to larger and better quarters in suite 1520, First National Bank building. The office is in charge of Herbert Top.

Busy Plants

In Detroit and Other Michigan Cities—Many War Orders

Detroit, May 11.—Motor car plants, as well as factories manufacturing motor car accessories, are running heavy in Detroit, as well as other cities of Michigan.

The Ford, Cadillac, Studebaker, Packard and Paige plants are reported to be running 24 hours daily; all other factories are working overtime and the indications are that this run of business will continue for some time.

The Packard company is doing a big business in trucks and is shipping a great portion of its product to Europe. The Ford has been running heavy for some time and recently the plant set a record—even for it—by turning out 2,011 cars in 24 hours. Skilled workmen are in abundance in Detroit and find little difficulty in securing work.

The Paige company has made a big start while the Maxwell is running particularly heavy. A lot of business is coming, of course, from the countries in conflict across the Atlantic and this business is bound to continue as long as the war is in progress. The accessory concerns are running stronger now than in some months and their business promises to become heavier as the summer advances.

Iron and steel plants are also doing a big business. While secrecy is maintained as to the exact amounts received, it is understood that war orders given to Detroit copper and brass companies mounted well into the millions and that a number of plants are now working on these. Shrapnel is being produced in large quantities and this is another business that is bound to be big as long as the war lasts.

Building operations are also being pursued rapidly. A number of big structures will be put up in the downtown district this summer.

Ore Analyses

Show Slight Change in Average Iron Content Last Year

The average analyses of bessemer and non-bessemer ores and percentages that bessemer ore is of all shipments made from the Lake Superior ranges for 1914, with the exception of low grade silicious and manganiferous ores and small tonnages of other ores not included, have been compiled, as in past years, by W. L. Tinker, secretary of the Lake Superior Iron Ore Association, Cleveland. No important changes as to ore analyses or percentage of bessemer are shown for 1914 as compared with 1913, but the accompanying chart indicates in a very impressive manner how the percentage of bessemer compared with non-bessemer has declined since 1902. The phosphorus content of bessemer ores has not changed to any marked degree in recent years.

The average iron (natural) content of the total of 30,475,694 tons of all kinds of Lake Superior ores shipped in 1914 was 51.6115 per cent. This compares with 51.6311 per cent as the average iron (natural) for the total output of all ore shipped from all Lake Superior ranges in 1913, when the aggregate output was 46,385,288 tons. This is a decrease of 0.0196 per cent and it drops the average to the lowest recorded in the past dozen years. On the old ranges, the average natural iron content increased in 1914 to 53.4684 per cent, as compared with 53.3422 per cent in 1913, a gain of 0.1262 per cent. On the Mesabi range, the average natural iron content decreased in 1914 to 50.7480, compared with 50.9701 per cent in 1913, a decrease of 0.2221 per cent.

In the old ranges, the average phosphorus content of bessemer ores decreased in 1914 to 0.03897 per cent, compared with 0.03936 per cent in 1913, a decrease of 0.0039 per cent. On the Mesabi ores, the phosphorus content in the 1914 shipments increased to 0.04512 per cent, compared with 0.04427 per cent in 1913, an increase of 0.00085 per cent. The average phosphorus content of all bessemer ores from all ranges shipped in 1914 was 0.04335 per cent, compared with 0.04303 per cent in 1913, an increase of 0.0032 per cent. The average silica content of all bessemer ore shipments in 1914 was 7.7192 per cent, compared with 6.8092 per cent in 1909. The average moisture contained in the total bessemer ore shipments in 1914 was 10.6625 per cent, compared with 10.7906 per cent in 1913 and 10.0862 per cent in 1912.

Appointed Agents.—Eaton, Rhodes & Co., First National Bank building, Cincinnati, have been appointed exclusive sales agents in all territory for Ashland and Boyd makes of machine cast, sandless, foundry, malleable and basic pig iron, which are manufactured by the Ashland Iron & Mining Co., Ashland, Ky.

Canada Profits

From Large War Orders and Contracts for Steel Rails for South Africa

Toronto, May 11.—J. H. Plummer, president of the Dominion Steel Corporation, was in Toronto last week and in an interview with your correspondent stated that while the domestic market remained quiet, there was a heavy demand for steel in England and France. The requirements of the export trade included steel billets, wire rods, wire and nails, but this market was limited by the difficulty of obtaining transportation facilities. If this could be successfully overcome, the sales of the company abroad could be largely increased. Another line which showed improvement was steel rails, for which an order amounting to 35,000 tons had been received from South Africa, and a similar contract from the same quarter has gone to the Algoma Steel Corporation. The demand for steel had resulted in increased activity at the iron mines at Wabana, where both the Dominion and Nova Scotia companies are increasing their forces.

President Robert E. Harris, of the Nova Scotia Steel & Coal Co., confirms statements respecting new orders for shells from the British war office and cars from the Russian government. The latter order is for 2,000 steel frame box cars, which will be built by the Eastern Car Co., a subsidiary of the Nova Scotia Co., at Trenton, N. S. The shell order approximates $2,600,000.

The Canadian Locomotive Co., Kingston, Ont., has in hand enough war orders to keep its plant in operation for a year and a half. At present 400 men are employed and the staff will be considerably increased. A. W. Wheatley, general manager, states that an extension of the plant will be necessary. The addition will be 233 feet long by 67 feet wide.

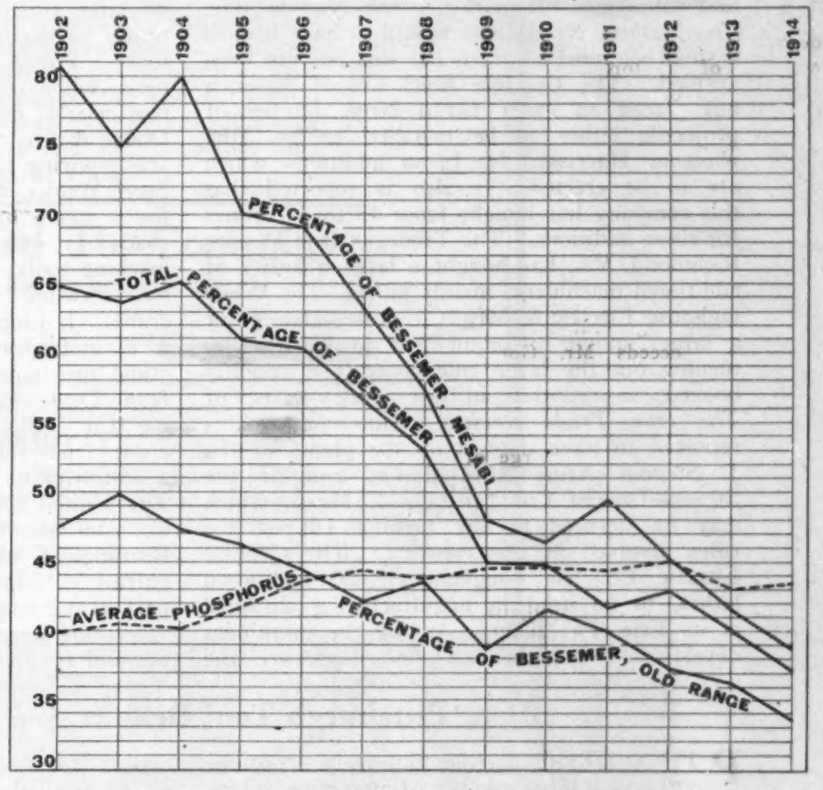


CHART SHOWING PERCENTAGE OF BESSEMER ORES ON MESABI; ON OLD RANGES AND ON ALL RANGES; ALSO AVERAGE PHOSPHORUS CONTENT FOR ALL RANGES IN THOUSANDS OF ONE PER CENT, 1902-1914

To Install Electric Furnaces.—Licenses have been issued by the United States Steel Corporation to the Michigan Steel Castings Co., Detroit, for the installation of a 6-ton and a 2-ton Heroult electric furnace, which will be employed in the making of steel castings. The electric furnace installation will replace a 2-ton converter.

Domestic Tool Demand Improves

More Interest Being Shown in Machines for Domestic Use—War Orders Drop Slightly But Continue to Sustain Market

IN COMPARATIVE terms, the machinery market at present, is quiet. However, a large amount of business has been placed during the past week, the bulk of which originated with companies having war orders on their books. Among the concerns who have just booked contracts for making shrapnel are the Laconia Car Co., Laconia, N. H., and the Canadian General Electric Co. Both concerns have bought large quantities of equipment and still are in the market. The Nashua Mfg. Co., Nashua, N. H., also is said to have booked a small shrapnel contract, but this has not been verified. The Crucible Steel Co. of America has placed an order for a large number of projectile lathes to be installed at its Atha plant at Harrison, N. J., in additions which are to be erected. It also is reported that this company has bought from 15 to 17 cranes for these additions. The Tredegar Iron Works, Richmond, Va., has bought a large quantity of additional machinery, mainly lathes. The Westinghouse Electric & Mfg. Co. is negotiating for a large amount of equipment to be used in turning out the large rifle contract it recently booked, as reported in last week's issue of *The Iron Trade Review*. This company is reported to have options on the plants of the J. Stevens Arms & Tool Co. and of the Stevens-Duryea Co., Springfield, Mass., which may be devoted to the turning out of the rifles involved in this contract. The General Electric Co. has bought some 50 additional lathes, to be used in manufacturing shrapnel at its Erie, Pa., plant. Among the prominent developments of the last few days, are the letting of contracts for further extensive additions by the Remington Arms-Union Metallic Cartridge Co., Bridgeport, Conn., and the Winchester Repeating Arms Co., New Haven, Conn. The Toledo Bridge & Crane Co., Toledo, O., has booked a large cartridge case contract from the Canadian Car & Foundry Co. The Locomobile Co. of America, Bridgeport, Conn., which has let contracts for another addition, to be used in turning out motor trucks on large orders received from the allies, continues to negotiate on a large list of machine tools. Purely domestic demand for machine tools, while continuing to improve, reflects no particularly important developments. Phelps, Dodge & Co., 99 John street, New York City, are inquiring for a 54-inch planer. The Chrome Steel Works, Chrome, N. J., is in the market for a steam hammer. The Pennsylvania railroad has out a few scattered inquiries for machine tools. This road has bought a three-ton Pawling & Harnischfeger grab bucket crane. J. Llera, 30 Church street, New York, it is understood, closed for the grab bucket crane mentioned in last week's issue of *The Iron Trade Review*. The Morgan Engineering Co., Alliance, O., has booked a 15-ton crane from the International Nickel Co., and a 25-ton crane from the Canadian Copper Co. The United States Cast Iron Pipe & Foundry Co. continues to figure on some cranes for its Birmingham plant. The volume of crane inquiries is improving. There are several export crane inquiries in the market, including several of large size from Russia. The export demand for machine tools is comparatively quiet.

Pittsburgh Tool Dealers Are Busy

PITTSBURGH machine tool dealers continue to take a large number of attractive orders. Concerns benefiting from the European war are buying numerous types of tools and demand for equipment in the general domestic field is steadily increasing. The Crucible Steel Co. of America is reported to have closed for about 17 cranes for its Atha plant at Harrison, N. J. The Pressed Steel Car Co., Pittsburgh, is expected to benefit from a huge order for shipment to Russia, which will necessitate installing considerable additional equipment. The Westinghouse interests, which have taken large orders for war material, continue to figure in the market for equipment. The McKeesport Tin Plate Co., McKeesport, Pa., which will double its capacity, has sent out preliminary inquiries for nine electric cranes, formal bids on which probably will be asked within the next week. The Wheeling Steel & Iron Co., which is increasing capacity at its Yorkville tin plate plant, has awarded a contract to the Wheeling Mold & Foundry Co., Wheeling, W. Va., for two 28-inch mills and necessary shearing equipment. The Carnegie Steel Co. will buy some additional tools for its tie mill at Munhall, Pa.

Good Demand Continues at Chicago

CHICAGO dealers find their floors practically swept bare of lathes and all machines that can be used to turn shrapnel cases and other munitions. Buyers from the east have been combing that territory until probably a score of these machines cannot be found at present. As a result, domestic users in the west desiring to add to their equipment find lathes of any kind are not procurable. Fairbanks, Morse & Co. was in the market last week for six lathes and had difficulty in finding them. An inquiry from Saskatchewan, Canada, for 20 lathes was received Friday, but could not be filled as that number of the proper sort

Notice the illustration carefully. Imagine if you can the severe treatment that this flooring has to undergo. No other flooring but Ayer & Lord Interior Wood Blocks could long survive such service.

The Thew Automatic Shovel Co., Lorain, Ohio, having thoroughly proved this by investigation, made the installation.

Another "Boost"—

"About five years ago we placed your blocks in the ground floor of a machine shop, to be used only temporarily for that purpose. The ground was hard — we leveled it, put on about an inch of sand, laid the blocks on this and put a little sand between the blocks. The floor is still giving excellent satisfaction and will last a long time with little or no further attention."

Ayer & Lord Tie Company

General Office: Railway Exchange, Chicago

CLEVELAND, OHIO, 926 Illuminating Bldg.
KANSAS CITY, MO., 1117 Rialto Bldg.
MEMPHIS, TENN., 1402 Exchange Bldg.
PHILADELPHIA, PA., 319 Perry Bldg.

Ayer & Lord Interior Wood Blocks stand for
SERVICE! DURABILITY! ECONOMY!

They are Healthful, Permanently Smooth, Dry and Dustless. We guarantee them to be the most serviceable flooring that you could install.

Our little booklet "FLOORS" is quite interesting. Just say the word and we'll mail you one, free.

were not available. A Canadian buyer seeking 10 lathes was unable to fill his needs. Some second hand lathes are being picked up by dealers and shipments on orders placed with manufacturers several months ago, are expected to relieve the situation in a short time. Demand from western machine shops for additional tools continues steady and business is better in a domestic way than for a long time. Inquiries hold up and usually result in orders. The expected list of the Chicago & North-Western railroad has not appeared but that road has asked for a planer and a few other tools for immediate delivery.

Cincinnati Shops Running Full

LITTLE new business is being placed with machine tool manufacturers in Cincinnati, although inquiry is being made for hundreds of lathes, and several good lists are also out for milling machines. Shops, however, have sufficient orders to run them at full capacity for several months, and as all inquiries call for immediate delivery, they cannot be filled. Makers of lathes are bending every effort to increase production, and a few of the larger plants, such as the Lodge & Shipley Machine Tool Co., the R. K. LeBlond Machine Tool Co., and the American Tool Works Co., are each turning out 200 lathes a month. The John B. Morris Machine Tool Co. has reduced its capital stock from $125,000 to $25,000, despite the fact that it is booked ahead for several months on lathes. The reason given is better facilities for handling its business. Fred A. Geier, of the Cincinnati Milling Machine Co., has purchased an interest in the Cincinnati Shaper Co., and the latter will be used largely for making parts for milling machines. The Wadsworth Watch Case Co., Newport, Ky., has refused an order for 300,000,000 cartridges from England, as new equipment would be required and the company has large orders for its products.

EASTERN STATES

NASHUA, N. H.—Nashua Mfg. Co., it is reported but not verified, has a small contract for making shrapnel. This concern has let contracts for a 9-story, 160 x 320-foot warehouse.

LAWRENCE, MASS. — National Tool Co. has been incorporated; $25,000 capital stock; by Rodger S. Woodburn, Samuel Black and James Walker.

WORCESTER, MASS.—Fire in the 4-story, brick building at 1 Assonet street, May 8, owned by the L. W. Pond Machinery & Foundry Co., 37 Gold street and occupied by that firm on the first floor and by the Parker Wire Goods Co. on the other floors, did damage estimated at $10,000, fully covered by insurance. Little harm was done to the machinery of either company. The Parker company is to vacate July 1 and the entire building will be occupied by the Pond company.

BRIDGEPORT, CONN.—Lantam Anti-Friction Co. is about to start work on a 3-story, 67 x 89-foot machine shop.

BRIDGEPORT, CONN.—Bridgeport Hardware Co. has started work on a 3-story, 40 x 133-foot building to manufacture hardware.

BRIDGEPORT, CONN.—Locomobile Co. of America has let contract for a 1-story, 50 x 60-foot case hardening building. This company has a list of machine tools out on which it has not yet closed.

BRIDGEPORT, CONN.—Jas. Stewart Inc., 30 Church street, New York, has begun work for the Remington Arms-Union Metallic Cartridge Co. on five new 5-story cartridge buildings, each 62 x 275 feet on Boston avenue; on 1-story, 64 x 352-foot ammunition building on Boston avenue and on a 1-story, 90 x 121-foot power house.

HARTFORD, CONN.—Whitney Mfg. Co., manufacturer of hardware, is having plans drawn for 4-story, 60 x 64-foot addition.

HARTFORD, CONN.—Taylor & Fenn Co. has received a large sub-contract from the Pratt & Whitney Co., Hartford, Conn.

HARTFORD, CONN.—Billings & Spencer Co., drop forgings and tools, is making extensive alterations to its newly-acquired plant, formerly the Columbia bicycle works and is erecting a boiler room and transformer house. The company states that the old plant will not be vacated at once, as there are possibilities that both plants will be needed.

HARTFORD, CONN.—Hartford Machine Screw Co. has awarded contract for its proposed 5-story factory and office building, 50 x 206 feet.

NEW HAVEN, CONN. — Westinghouse, Church, Kerr & Co., New York, have the contract for another 1-story, 54 x 208-foot building to be erected for the Winchester Repeating Arms Co. The latter company also has let contract for a 5-story and basement, 54 x 291-foot addition to the Aberthaw Construction Co.

WATERBURY, CONN.—Waterbury Tool Co. will erect a new building on a site it just has purchased on Watertown street.

WATERBURY, CONN.—Scoville Mfg. Co. is about to erect a new building, 200 x 600-feet on Hamilton avenue.

ASTORIA, N. Y.—Oderwald Iron Works, structural and ornamental iron, has been incorporated; $5,000 capital stock; by H. A. Sherry, S. and J. Oderwald, 321 Elm street.

BRONX, N. Y.—Bronx Terminal Iron Works has been incorporated; $10,000 capital stock; by K. Schmuckler, A. A. Kutller and J. Ment, 753 East 151st street.

BUFFALO.—C. J. Handel, 314 East Seneca street, has let contract for a 1-story, 30 x 78-foot addition to his plant at 131 Myrtle street.

BUFFALO.—Utilities Products Co., stove and furnace attachments, smoke and combustion regulators, has been incorporated; $500,000 capital stock; by A. E. Bargar, R. T. Crandall and E. A. Roure, 1142 Times building, Buffalo.

ITHACA, N. Y.—Gayuga Power Corporation has received its charter to generate and distribute electricity; $75,000 capital stock. The incorporators are W. Rose, H. Stanley and F. S. Connell, 132 Remsen street, Brooklyn.

NEW WINDSOR, N. Y.—G. W. Bradley Ax & Tool Mfg. Co. has been incorporated; $10,000 capital stock; by C. Hogue, L. A. Plass, J. E. Sloane.

NEW YORK.—Phelps, Dodge & Co. are in the market for a 54-inch planer.

NEW YORK.—General Zinc Co., mining, smelting, refining, minerals, oil, coal, etc., has been incorporated; $250,000 capital stock; by J. A. Arroyo, A. C. Hammerand and L. C. Butler, 115 Broadway.

NEW YORK.—Duriron Castings Co. has increased its capital stock from $50,000 to $300,000.

NEW YORK. — Connex Engineering & Construction Co. has been incorporated; $300,000 capital stock; by G. Lester, T. G. Davis and E. Downing, 112 West Thirty-ninth street.

ROCHESTER, N. Y.—Erdle Perforating Co., 171 York street, has let contract for a 1-story, 50 x 66-foot building.

ROCHESTER, N. Y.—Geo. B. Brownard, manufacturer of fire doors and other appliances, 267 Mill street, has bought a site on Blossom road and will erect a 1 or 2-story factory.

SYRACUSE, N. Y.—H. H. Franklin Mfg. Co. is about to take bids on a 3-story, 56 x 80-foot addition to its automobile factory.

SYRACUSE, N. Y. — New Process Gear Corporation will build a 4-story and basement 75 x 225-foot addition. Day & Zimmerman, Philadelphia, are drawing the plans.

SYRACUSE, N. Y.—The city has received bids on a vocational high school, 2-story and basement, 50 x 190-feet, with two wings, each 60 x 120 feet, also a boiler house, 50 x 60 feet, to be erected at Seneca and Tully streets, at a cost of about $400,000.

CANONSBURG, PA. — Standard Tin Plate Co., which plans to erect 12 additional mills, and necessary equipment including heating and annealing furnaces, doubling and squaring shears, etc., is getting estimates for the cost of contemplated improvements; directors of the company are expected to decide upon a definite program at an early date.

DUBOIS, PA.—Osborn Machine Co. will erect a 3-story and basement, 80 x 100-foot addition. This concern has out inquiries for a few machine tools.

ERIE, PA.—Plans for a 4-story warehouse building are being prepared by H. Edsall Barr, architect; the structure will be erected for private interests.

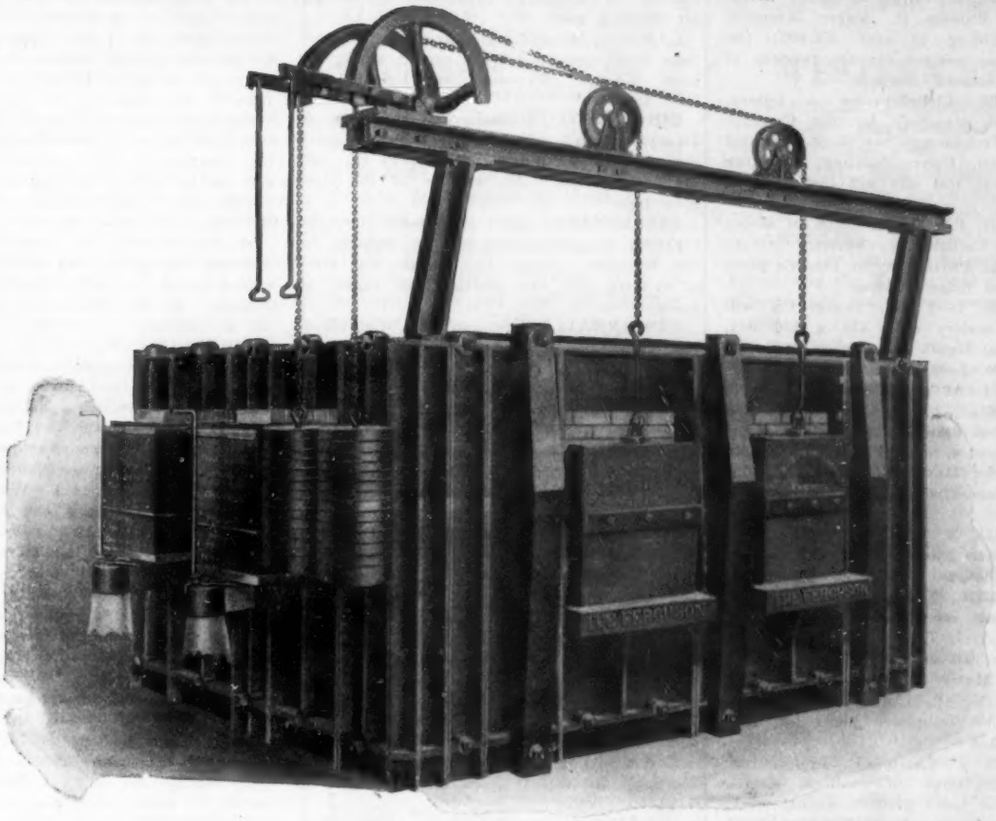
ERIE, PA.—Erie Stove & Mfg. Co. has completed plans for a 1-story factory building; Armin Shotte, engineer in charge, will receive bids about May 30.

FARRELL, PA.—American Sheet & Tin Plate Co. plans to replace its wooden box factory with a steel and concrete building; the erection of a new carpenter shop also is contemplated; improvements will cost about $50,000.

JOHNSTOWN, PA. — Johnstown Rubber Co. will build a 2-story, brick and steel

FERGUSON

SHRAPNEL



FURNACES

SOME OF THE USERS

AMERICAN LOCOMOTIVE CO.
CANADIAN CAR & FOUNDRY CO.
AMERICAN ROLLING MILL CO.
CANADIAN LOCOMOTIVE CO.
THE WYMAN & GORDON CO.
CANADIAN PACIFIC RY.
WM. WHARTON JR. & CO.
MONTREAL LOCOMOTIVE WORKS

THE RAILWAY MATERIALS CO.

CHICAGO
217 Railway Exchange

PLANTS { Phoenixville, Pa. / Toledo, Ohio / Stevens Point, Wis.

NEW YORK
Singer Bldg.

Say you saw it in THE IRON TRADE REVIEW

building, 100 x 200 feet, to cost about $15,000.

JOHNSTOWN, PA.—Stineman Coal & Coke Co. has awarded a contract to W. J. Rose & Sons for the erection of a new power house; the Ridgway Engine & Dynamo Co., Ridgway, Pa., will furnish necessary equipment.

MEADVILLE, PA.—The contract for fireproof laboratory building for Allegheny college has been awarded Cuthbert Bros., Pittsburgh, for $40,000.

PHILADELPHIA. — Pennsylvania railroad has put out a few scattered inquiries for machine tools.

PITTSBURGH.—Westinghouse Electric & Mfg. Co. has begun negotiations for the purchase of a large amount of equipment to manufacture rifles.

PITTSBURGH.—Janssen & Abbott, engineers, have awarded contract to Henry Shenk Coal Co. for William H. Singer Memorial Laboratory building to cost $90,000; the building is being erected for the trustees of the Allegheny General Hospital.

PITTSBURGH.—Contract for a 3-story, brick and steel dormitory for the Carnegie Institute of Technology has been awarded James L. Stuart, Oliver building; structure will be 38 x 145 feet and will cost approximately $30,000.

WOODLAWN, PA.—Loyal Order of Moose has engaged Carlisle & Sharer, Jenkins Arcade building, Pittsburgh, to prepare plans for a store and lodge building.

CAMDEN, N. J.—F. W. Taubel Co. will erect another hosiery mill, 120 x 120 feet, three stories, at Eighth and Spruce streets.

CHROME, N. J.—Chrome Steel Works, is in the market for a steam hammer.

EAST ORANGE, N. J.—C. D. S. Tool & Specialty Co. has been incorporated to manufacture tools, molds, specialties, etc.; $10,000 capital stock; by Harry H. Picking, Gordon Grant and Charles O. Geyer, all of East Orange.

HOMESTEAD, N. J.—Atlas Finishing Co. on the Paterson plank road will build a 1-story power house.

MURRAY HILL, N. J.—Concrete Construction Co. has been incorporated; $100,000 capital stock; by A. J. Tharp, A. B. Waythaler, W. H. Warner, all of New York City, and W. H. Mears, Murry Hill.

NEWARK, N. J.—Universal Castor & Foundry Co. has completed plans for additions to its plant.

NEWARK, N. J.—Charles P. Taylor, Inc., has been incorporated to deal in electric motors, dynamoes, etc.; $100,000 capital stock; by Ralph H. Dixon, Aura M. Higbee, J. Fred Anderson.

NEWMARKET, N. J.—Baryta Mfg. Co. will build a 1-story, 135 x 225-foot plant here.

OXFORD, N. J.—Board of trade has donated to Geo. E. Hochesang and Harmon Riehl, of Hackettstown, N. J., foundry and machine shop belonging to the board, together with four acres. The foundry will be operated on jobbing work and will be gotten into shape immediately. The business will be conducted under the title of the Oxford Foundry & Machine Co.

WILDWOOD, N. J.—This city will purchase the Wildwood waterworks for $554,000.

DOVER, DEL.—Kent Typewriter Co., capitalized at $2,000,000, was incorporated at Dover by C. H. Smith, Youngstown, O.; W. S. Pyfreer, Kent, O.; F. J. Leach, Clyde, O., and R. H. Nesbitt, Akron. The company is empowered to construct engines, boilers, dynamos, generators, tools and implements and all contrivances for developing and utilizing power in all forms.

WILMINGTON, DEL.—Harlan & Hollingsworth Corporation has let contract to Fred A. Havens & Co., Philadelphia, for a 2-story, 45 x 200-foot addition.

FREDERICK, MD. — Arthur G. Watkins, Mechanicsburg, Pa., is negotiating with the board of trade for a plant for the manufacture of floating water power plants.

WASHINGTON.—Craig Ship Building Co., Long Beach, Cal., was low bidder for constructing the lighthouse tender Cedar for the government at $234,500.

CENTRAL STATES

AKRON, O.—Summit Welding Garage & Machine Co. has been incorporated; $10,000 capital stock; by S. G. Raun, J. G. Chalfant and Clarence Becker.

ALLIANCE, O.—City officials are asking bids on an elevated steel tank of 40,000 gallons capacity for its waterworks system; Chester & Fleming, engineers, Pittsburgh, are drawing plans.

CANTON, O.—Canton Electric Cut Co. has been incorporated; $50,000 capital stock; by Levi Werstler, Raymond W. Loichot and Paul Loichot.

CINCINNATI. — Cincinnati, Hamilton & Dayton railroad will spend $200,000 to erect new bridges at Sidney, O., Troy, O., and Montezuma, Ind. All will be of the steel span type.

CINCINNATI.—Light equipment for the repairing of automobiles will be required by the Evanston Garage Co., which will erect a building for the storage and repair of automobiles.

CINCINNATI.—Cincinnati Car Co., Winton Place, has secured a contract from the Chicago Elevated Railway Co. for 122 steel cars, 48 feet long. They will be completely equipped with motors, air brakes, and all accessories.

CINCINNATI.—Board of education will erect a manual training high school on the site of the old Garford school property on Sycamore street. Considerable woodworking, machine shop and foundry equipment will be needed. Details are not as yet available.

CLEVELAND.—Commissioner of purchases and supplies will receive bids until noon, May 20, for two steam, turbine driven, centrifugal feed pumps for the water division.

CLEVELAND.—Hamill-Hickox Co., machinery, has been incorporated; $10,000 capital stock; by Laurence Hamill, Wilson B. Hickox, W. C. Sager, Richard Inglis and V. Svancara.

COLUMBUS, O.—Bessie Furnace Co. has increased its capital stock from $250,000 to $300,000.

COLUMBUS, O.—New York Central Railroad Co. has increased its capital stock from $300,000,000 to $400,000,000.

HAMILTON, O.—American Foundry & Machine Co. plans to erect a reinforced concrete foundry building at its plant at Lindenwald, to cost $30,000.

KENTON, O.—France Stone Co., Toledo, which will start soon on the construction of its proposed plant near Kenton, is considering installing its own electric plant.

MIDDLETOWN, O.—The renewal of a lighting contract with the Middletown Gas & Electric Co. is under consideration and a municipal plant is a possibility; Charles Kundtz is secretary of the city commission.

NEWARK, O. — Oliver H. Brown, field representative of the Standard Oil Co., says plans are being drawn by Patton & Hawkins and bids will be received shortly for a $25,000, reinforced concrete and steel warehouse to be erected by the Standard Oil Co. in this locality.

NORTH INDUSTRY, O.—O. C. Barber Mining & Fertilizer Co. will build a main building, 70 x 700 feet, a machine shop 42 x 95 feet, and several smaller structures, considerable equipment for the machine shop and power house will be purchased.

PORT HOMER, O.—Peerless Clay Mfg. Co. has been incorporated; $100,000 capital stock; by William H. Myers, W. B. Goucher, W. S. McCammon, Thomas J. Myers and John J. Burns.

STEUBENVILLE, O. — La Belle Iron Works has decided to erect a by-product coke plant to supply fuel for its blast furnace plant consisting of two stacks; the company is considering plans for an extension to its pipe and sheet mills.

TOLEDO, O.—Toledo Bridge & Crane Co. has secured large cartridge case and shrapnel contract from the Canadian Car & Foundry Co.

TOLEDO, O.—Willys-Overland Automobile Co., which is working on a $1,000,000 addition to its plant, has awarded a contract to the H. J. Spieker Co. for a $20,000, brick and concrete power house.

TOLEDO, O.—Julius Compte & Co. has secured the general contract for the $100,000, 5-story, building to be erected in Toledo by John B. Breyman, for the International Harvester Co.; plans by Devore McGormley Co.

WILMINGTON, O.—Wilmington Castings Co., machinery, has been incorporated; $30,000 capital stock; by Joseph W. Early, J. D. Boone, D. M. Horton, F. S. Horton, E. R. Balee and D. L. Horton.

HUNTINGTON, W. VA. — Ohio Valley Machine Works has been incorporated; $10,000 capital stock; by W. W. Magoon, L. A. Walcott, H. W. Jones, C. E. Taylor and M. E. Brown.

WHEELING, W. VA.—C. W. Bates, this city, has been engaged to prepare plans for a 3-story bank and office building for the Farmers & Merchants National bank, Bellaire, O.; foundations and floors will be of reinforced concrete construction and fireproofing material will be used throughout.

WHEELING, W. VA.—Wheeling Steel & Iron Co., which owns the Wheeling Sheet & Tin Plate Co.'s plant at Yorkville, O., has ordered two 28-inch hot mills, squaring and doubling shears and other necessary mill equipment from the Wheeling Mold & Foundry Co., this city; other improvements, including an extension to the shipping department, will be made at the Yorkville plant.

CARLISLE, KY.—Carlisle Electric Light & Power Co. will purchase equipment for an ice factory to be operated in connection with its present plant.

COVINGTON, KY.—An ordinance is being prepared for the sale of $200,000 worth of bonds for water main extensions.

DOVER, KY.—C. C. Pyles, Ewing, Ky., is in the market for a 10-horsepower, gasoline engine for a feed mill for which he is purchasing equipment.

ELKHORN CITY, KY.—An electric power plant will be installed by the Kentucky Block Coal Co., which is opening up a large mining operation near Elkhorn City.

MAYSVILLE, KY.—Maysville Cotton Mills will purchase equipment at once to replace that burned in a fire May 4, when $40,000 damage was caused.

MIDDLESBORO, KY.—L. C. Gunter, who has purchased the plant of the Luke & Drummond Coal Co., plans to install additional power and mining machinery.

MT. OLIVE, KY.—Robertson County Light & Power Co. will install an electric light plant. M. R. Bethel and Roy Trelkeld are in charge.

OWENSBORO, KY. — Wright Machine Co. has been incorporated to manufacture gasoline engines and excavating machinery; $150,000 capital stock; John S. Wright is president. This company succeeds the Gunther-Wright Machine Co.

PADUCAH, KY.—Exall & Co. have let a

contract for the erection of a coal storage plant, and now are arranging for equipment.

PADUCAH, KY.—Sam Foreman will build a large garage and repair shop. An operating company with $100,000 capital stock has been incorporated.

PINEVILLE, KY.—Continental Coal Corporation is opening a new mining operation, and will install a 300-horsepower, steam power plant. A contract for the tipple and accessory equipment has been let to the South Side Foundry & Machine Works, Charleston, W. Va.

SMITHS GROVE, KY.—J. Edwards, Pembroke, Ky., has secured a site in Smiths Grove and will install an ice factory and an electric light and power plant.

FORT WAYNE.—The board of works is considering buying a 700-horsepower high pressure boiler for the municipal electric plant and an addition to the boiler house.

FRANKLIN, IND.—Plans have been drawn by H. W. Foltz, architect, Indiana Pythian building, Indnanapolis, for the Indiana Masonic home at Franklin, including an administration building, costing $100,000, and a light and power plant.

INDIANAPOLIS. — Fire recently damaged the plant of the Premier Motor Mfg. Co. to the extent of $20,000.

INDIANAPOLIS. — Martindale-Millikan Co. has been incorporated to manufacture automobiles; $85,000 capital stock, by F. M. Millikan, F. N. Martindale and J. N. Staley.

NEW ALBANY, IND.—New Albany Mfg. Co., stone-working machinery, has leased plant to Henry H. Martin, of the Henry H. Martin Mfg. Co., which operates a foundry in Louisville, Ky. The plant will be operated as the New Albany Machine Mfg. Co. and new lines probably will be added. Regarding equipment no changes will be made at present.

SOUTH BEND, IND.—George T. Smith Co. has been incorporated to manufacture machinery; $300,000 capital stock; by George T. Smith, Frank M. Smith and Jeptha B. Sikes.

SOUTHERN STATES

RICHMOND, VA.—Tredegar Iron Works has bought considerable additional equipment, including mostly lathes.

STATESVILLE, N. C. — Southern Power Co. has purchased a site and will commence work shortly on a $50,000 transformer station.

DECATUR, ALA.—Lynnville Mill & Elevator Co.'s plant, which was badly damaged by fire several weeks ago, will be replaced by a $75,000 plant.

BATON ROUGE, LA.—Modjeski & Angier, consulting engineers, Chicago, have been commissioned by the Baton Rouge Bridge & Transit Co. to make soundings for the bridge over the Mississippi river at Baton Rouge.

NEW ORLEANS. — Preparations are being made for a bond issue for the proposed municipal electric plant to produce three-cent current. Cleveland engineers estimate $5,000,000 to $6,000,000 will be needed to meet all demands. Probably a $3,000,000 plant will be built at first.

AUSTIN, TEX.—Citizens will vote June 2 on an issue of $275,000 bonds for bridges and other public work, M. C. Welborn is city engineer.

FORT WORTH, TEX.—E. E. Dickerson is to build a plant at Sixteenth and Commercial streets to manufacture a patented cotton cleaning machine.

McKINNEY, TEX.—The city is considering buying sometime during the year a 200-kilowatt, two-phase, 60-cycle, 2,300-volt generating unit direct connected. W. L. McKinnon, superintendent.

POINT ISABEL, TEX.—Bids will be taken until May 29, H. R. Stanford, chief of bureau of yards and docks, navy department, Washington, D. C., for two 300-foot, steel towers for the radio station at Point Isabel, Tex. S. P. E. C., 2156.

FORT WORTH, TEX.—Rotary Valve Engine Co. has been incorporated; $25,000 capital stock; by S. Davidson, T. Yarbrough and A. J. Ray.

SEGUIN, TEX.—Seguin Electric & Power Co., Owen A. Gafford, manager, expects to install a 137 kilowatt-ampere, 3-phase, 60-cycle, 2,300-volt, water wheel type generator with exciter and switchboards, together with two 150 brake horsepower vertical water wheels and transmission machinery. Bids will be asked in about 30 days.

THRALL, TEX.—George L. Lebus of Electra, Texas, is planning to build a machine shop here for repairing well drilling and pumping machinery.

ARKANSAS CITY, ARK.—Lambe & Denmarke Light & Water Co. has bought a water works and will install an electric light plant and rebuild the water works plant at an expense of about $50,000.

PINE BLUFF, ARK. — Standard Brake Shoe & Foundry Co., a new firm, has taken over the Dilley Foundry Co. and will begin at once the erection of a $40,000 plant, including an open hearth steel foundry. It is hoped to have the plant in operation by July 1.

War or Peace

Do YOU envy the man who must decide?
Well,
The decision is up to YOU, MR. SALES MANAGER!
The president of your company wants results.
He makes WAR if you don't give them,
And
PEACE, if you do.
Here's YOUR chance,
Decide which you prefer.

Tropenas Converter Co., 50 Church street, New York City, is in the market for a pneumatic forge hammer with a head weighing 773 pounds for export to France. A second-hand hammer would be considered if in good condition.

R. L. Bigsley, Dothan, Ala., is inquiring for gas and oil engines, 20 to 40 horsepower, 4 to 8-cylinder types, mounted on structural steel frames. He is also in the market for cable, 1 to 2 inches in diameter, excavator buckets and good roads machinery.

McKeesport Tin Plate Co., McKeesport, Pa., has sent out preliminary inquiries for nine electric cranes, formal inquiries on which probably will be asked next week.

Phelps, Dodge & Co., 99 John street, New York City, are inquiring for a 54-inch planer.

Oklahoma Iron Works, Tulsa, Okla., is in the market for a 5-ton crane.

American Foundry & Machine Co., Hamilton, O., plans to erect a $30,000 reinforced concrete foundry at its plant at Lindenwald.

Chrome Steel Works, Chrome, N. J., is in the market for a steam hammer.

Osborn Machine Co., Dubois, Pa., which will erect a 3-story, 80 x 100-foot addition, has inquiries out for a few machine tools.

Western Iron & Steel Co., Tacoma, Wash., recently incorporated by B. E. Paul and others, will establish a foundry for manufacturing a specialty.

Carnegie Steel Co. is in the market for some additional tools for its new steel tie mill at Munhall, Pa.

WESTERN STATES

BELFIELD, N. D.—Bonds amounting to $20,000 have been voted for a water works and electric light plant.

STERLING, NEB.—Citizens will vote soon on issuing $15,000 in bonds to cover the cost of a water works plant.

LAWRENCE, KANS.—Plans have been approved by county commissioners for a bridge over the Kansas river and they will be submitted to the war department for its approval.

ANACONDA, MONT.—City, M. J. Kelly, clerk, will install an ornamental lighting system on Main street, to cost about $6,000.

BUTTE, MONT.—An election will be held soon in Silver Bow county to vote on $85,000 bonds for fitting up the new jail building.

HAMILTON, MONT. — A riveted steel structure will replace the condemned bridge at Florence, Mont. E. H. Blakeslee, Hamilton, is county engineer.

HAVRE, MONT.—The county commissioners will receive bids until May 24, for the construction of a $125,000 courthouse and jail building. H. F. Bossout, architect, has prepared plans.

ACME, N. M.—The engineer of Chaves county, New Mexico, will report soon on a bridge over the Pecos river, estimated to cost $12,000.

GLENDALE, ARIZ.—This city is planning to build and equip a municipal water works system. J. B. Girand is engineer.

PHOENIX, ARIZ.—Plans are under way to install a 3,000,000 to 5,000,000-gallon pump at the municipal water works. V. A. Thompson is superintendent.

CALDWELL, IDA.—The city council is considering the construction of a power plant in conjunction with the Black canyon irrigation district.

OROFINO, IDA.—N. Brown, representing John W. Mariner, Milwaukee, Wis., has purchased 1,200 acres of timber land, three miles from Meippe, Ida., where it is planned to erect a mill.

EVERETT, WASH.—Weyerhaeuser Timber Co. will erect an addition to the electrically-driven sawmill, now nearing completion, in Everett. John P. Weyerhaeuser, Spokane, is president; George S. Long, Tacoma, secretary.

MONTESANO, WASH.—The county commissioners will receive bids until 1:30 p. m., May 24. for the construction of three bridges over the Wishkah river at an estimated cost of $19,000.

MONTESANO, WASH.—George E. Tilden, Seattle, head of a bond and brokerage company, requests a franchise for furnishing power and light on the theory of erecting a power plant on Lake Cushman.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery to July 1.)

Bessemer, valley	$13.60
Bessemer, Pittsburgh	14.55
Basic, Pittsburgh	13.45 to 13.60
Basic, eastern Pa.	13.25
Malleable, Pittsburgh	13.45 to 13.95
Malleable foundry, Chicago	13.00
Malleable foundry, Philadelphia	15.00 to 15.25
Malleable foundry, Buffalo	12.50 to 13.00
No. 1X foundry, Philadelphia	14.25 to 14.50
No. 2 foundry, Pittsburgh	13.45 to 13.95
No. 2 foundry, valley	12.50 to 13.00
No. 2 foundry, Cleveland	13.00
No. 2 foundry, Ironton	12.50 to 12.75
No. 2 foundry, Chicago	13.00
No. 2X foundry, Philadelphia	14.00 to 14.25
No. 2X fdy., N. J. tidewater	14.25 to 14.50
No. 2X foundry, Buffalo	12.50 to 13.00
No. 2 plain, Philadelphia	13.75 to 14.00
No. 2 plain, N. J. tidewater	14.00 to 14.25
No. 2 plain, Buffalo	12.25 to 12.50
No. 2 southern, Birmingham	9.75 to 10.00
No. 2 southern, Cincinnati	12.65 to 12.90
No. 2 southern, Chicago	13.50 to 14.00
No. 2 southern, Phila. delivery	13.75 to 14.00
No. 2 southern, Cleveland	13.75 to 14.00
No. 2 south'n, New York docks	13.50 to 13.75
No. 2 southern Boston, docks	13.50 to 13.75
No. 2 south. interior, New Eng.	14.25 to 15.25
No. 2 southern, St. Louis	13.40
Virginia No. 2X furnace	12.50 to 13.00
Virginia 2X, Philadelphia	15.25
Virginia 2X, Jersey City	15.50
Virginia 2X, Boston points	15.75
Gray forge, eastern Pa.	13.25 to 13.50
Gray forge, Pittsburgh	13.20
Gray forge, Birmingham	8.75 to 9.00
Silveries, 8 per cent, Jackson, O.	14.75 to 15.25
Silveries, 8 per cent Birmingham	12.50
Silveries, 5 per cent, Chicago	16.35
Standard low phos., Phil.	19.00 to 20.00
Lebanon low phos., furnace	16.00 to 16.50
Low phos., Pittsburgh	20.95 to 21.20
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	15.25 to 16.25
Charcoal, Buffalo	15.75 to 17.00
Charcoal, Birmingham	25.00

IRON ORE

(Lower lake ports.)

Old range Bessemer, 55 per cent.	$3.75
Mesabi Bessemer, 55 per cent.	3.50
Old range, non-Bess., 51½ per cent.	3.00
Mesabi non-Bessemer, 51½ per cent.	2.85

(Per unit Philadelphia.)

(Prices nominal.)

Foreign Bess., 50 to 65 per cent.	7½c to 8½c
For'n non-Bes., 50 to 65 per cent	7½c to 8½c

COKE

(At the ovens)

Connellsville furnace	$1.55 to 1.60
Connellsville fur. contr.	1.65 to 1.75
Connellsville foundry	2.00 to 2.40
Connellsville fdy. contr.	2.25 to 2.50
Wise county furnace	1.75 to 2.00
Wise county foundry	2.10 to 2.40
Pocahontas furnace	1.75 to 2.00
Pocahontas foundry	2.00 to 2.25
New River, foundry	2.50 to 3.00
New River, furnace	2.00 to 2.25

FERRO-ALLOYS

Ferro-mang., Balti., (prompt)	$100
Ferro-mang. (future), Balti.	88.00
Ferro-silicon, 50 per cent, Pbgh.	71.00 to 73.00
Ferro-silicon, 50 per cent, Phila.	71.00 to 73.00
Ferro-sil., 12 to 13 per cent.	18.00 to 18.50
Ferro-sil., 11 to 12 per cent.	17.00 to 17.50
Ferro-sil., 10 to 11 per cent.	16.00 to 16.50
Ferro-sil., 9 to 10 per cent.	15.00 to 15.50

(Ferro-silicon quoted at furnace Ashland, Jackson and New Straitsville)

Ferro-carbon titanium, carloads, per lb.	8c to 12½c

SEMI-FINISHED STEEL

Open hearth billets, Phila.	$22.06 to 22.56
Forging billets, Phila.	25.06 to 25.56
Forging billets, Pbgh.	25.00

Freight Rates via Panama Canal

Rates on finished materials, including plates, shapes, bars, wire, nails, etc., to Pacific coast points via Panama canal, per 100 lbs., in carload lots, exclusive of insurance and dockage.

From New York	$0.45
From Pittsburgh	.619
From Youngstown	.639
From Niles	.619
From Wheeling	.619
From Steubenville	.619
From Johnstown	.604
From Coatesville	.545
From Steelton	.555
From Bethlehem	.529
From Cleveland	.65
From Chicago	.765

Rates on sheet mill products $2 per ton higher.

Wire rods, Pittsburgh	$25.00
Billets, Pittsburgh	19.50 to 20.50
Billets, Youngstown	18.50 to 19.50
Sheet bars, Pittsburgh	20.00 to 21.00
Sheet bars, Youngstown	19.00 to 20.00
Muck bar, Pittsburgh	27.00

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh.	1.25c
Stand. open-hearth rails, Pbgh.	1.34c
Lgt. rails, 8-lbs., Pbgh. & Chgo.	1.22c
Lgt. rails, 12 lbs., Pbg. & Chgo.	1.17c
Lgt. rails, 16 to 20 lbs., Pgh. & Chgo.	1.12c
Lgt. rails, 25 to 45 lbs., Pbgh. and Chgo.	1.07c
Relaying rails, standard, Pbgh. & Chgo.	$23.00 to 24.00
Relaying rails, light, Chicago	21.50 to 22.50
Angle bars, st. sect. Pbgh. base.	1.50c
Angle bars, st. sections, Chicago	1.50c
Spikes, railroad, Pbgh.	1.35c to 1.40c
Spikes, railroad, Chgo.	1.50c
Track bolts, Pbgh.	1.85c to 1.90c
Track bolts, Chgo.	2.00c

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—	
Cleveland	$0.95
Newark, N. J.	3.00
New England	3.00
Philadelphia	2.79
Pittsburgh	.95
St. Louis	3.18
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail).	2.58
New York and Brooklyn (by canal)	1.00 to 1.50
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
New York (all rail)	6.15
New York (rail and water)	4.25
Philadelphia (all rail)	5.20
Philadelphia (rail and water)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
Chicago, to:—	
Des Moines	$2.80
Milwaukee	.50
Moline, Ill.	1.47
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh	1.20c
Structural shapes, Chicago	1.34c to 1.39c
Structural shapes, Philadelphia	1.359c
Structural shapes, New York	1.369c
Struc. shapes, San Francisco	2.00c to 2.05c
Tank plates, Chicago	1.29c to 1.39c
Tank plates, Pittsburgh	1.10c to 1.20c
Tank plates, Philadelphia	1.359c
Tank plates, New York	1.369c
Bars, soft steel, Pittsburgh	1.20c
Bars, soft steel, Chicago	1.39c
Bars, soft steel, Philadelphia	1.359c
Bars, soft steel, New York	1.369c
Hoops, carloads, Pittsburgh	1.25c to 1.30c
Bands, Pittsburgh	1.20c
Shafting, Pbgh., carloads, prompt	68 to 70 per cent off
Shafting, Pbgh., contr.	68 per cent off
Screw stks., Pgh. carl'ds,	68 to 70 per cent off
Bar iron, Chicago	1.15c
Bar iron, Philadelphia	1.175c to 1.225c
Bar iron, New York	1.15c to 1.20c
Bar iron, Cleveland	1.20c to 1.25c
Bar iron, Pittsburgh	1.20c to 1.25c
Hard steel bars, Chicago	1.20c to 1.25c
Smooth finish, mchy. steel, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	1.80c to 1.90c
No. 28, black, Chicago	1.89c to 1.94c
No. 28, tin mill, black, Pbgh.	1.85c to 1.90c
No. 28, galvanized, Pbgh.	3.30c to 3.40c
No. 28, galvanized, Chgo., nom.	3.94c
No. 10, blue, annealed, Pbgh.	1.35c
No. 10, blue, annealed, Phila.	1.459c to 1.509c
Tin plate, 100 lb., coke base.	3.20c to 3.35c

EXTRAS FOR SHEET OR TIN MILL SPECIFICATIONS

(Per hundred pounds.)

Single pickled, cold roll. and re-anl.	30 cents
Hot roll'd pickl'd and anl., tin mill	25 cents
Full pickl'd, cold rolled and re-anl.	50 cents
Auto sheets	75 cents
Blued stove pipe stock	10 cents
Range steel	30 cents
Re-squaring	10 cents
Roller leveling	10 cents
Patent leveling and re-squaring	35 cents
Oiling sheets	10 cents
Deoxidizing	10 cents
Lime finish	10 cents
Open-hearth stamping steel, free from mill scale	55 cents
Special open hearth deep stpg. steel free from mill scale	80 cents
Extra deep special auto body stock	$1.25
Ext. for 28 gage ov. 32 to 36-in. wide	10 cents

No reduction for sheets not annealed.

The above extras apply on both sheet and tin mill specifications, at the same rate.

IRON AND STEEL PIPE

(Pittsburgh.)

	Black. Butt-weld.	Galv. Butt-weld.
Steel, ¼ to 3 inches	79	68½
Iron, ¼ to 2 inches	71	57
	Lap-weld.	
Steel, 2½ to 6 inches	78	67½

BOILER TUBES

Steel, 3½ to 4½ inches l. c. l.	74
Iron, 3½ to 4½ inches l. c. l.	62

WIRE PRODUCTS

(Retailers' price 5 cents above jobbers' quotation.)

Wire nails, jobbers, Pittsburgh	$1.55 to 1.60
Plain wire, jobbers, Pittsburgh	1.35 to 1.40
Galvanized wire, jobbers, Pbgh.	1.85 to 1.90
Polished staples, Pbgh.	1.55 to 1.60
Galvanized staples, Pbgh.	2.05 to 2.10
Barb wire, painted, jobbers, Pbgh.	1.55 to 1.60
Barb wire, galv., jobbers, Pbgh.	2.05 to 2.10

IRON AND STEEL PRICES

Corrected up to Tuesday noon

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller or shorter, rolled threads, 80 and 15; cut threads 80 and 10; larger or longer, 75 and 17½.

Machine bolts with hot pressed nuts ⅜ x 4 inches, smaller or shorter, rolled 80 and 20; cut, 80 and 15; larger or longer, 80.

Gimlet and cone point lag or coach screws, 85 and 2½.

Hot pressed square, blank or tapped nuts. $6.40 off list; hot pressed hexagon blank or tapped, $7.30 off.

Cold pressed, square, blank or tapped, $6.10 off; hexagon, blank or tapped, ⅝ inch and larger, $7.50; ⅝-inch and smaller, $8.00.

RIVETS

Structural rivets, Pbgh	1.45c to 1.50c
Structural rivets, Chgo	1.68c
Boiler rivets, Pbgh	1.55c to 1.60c
Boiler rivets, Chgo	1.78c

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	1.55c to 1.60c

COLD ROLLED STRIP STEEL

(Subject to regular extras.)

0.10 to 0.19 Carbon.	Base price Cut to length	
	Hard.	Soft.
1½ inch and wider	2.85	3.10
0.100 and thicker	2.95	3.20
0.050 to 0.099 inc.	3.10	3.35
0.031 to 0.049 inc.	3.35	3.75
0.025 to 0.030 inc.	3.60	4.00
0.020 to 0.024 inc.	3.80	4.20
0.017 to 0.019 inc.	4.70	5.20
0.015 and 0.016	5.10	5.60
0.013 and 0.014	5.95	6.45
0.012	6.55	7.05
0.011	6.90	7.40
0.010	7.25	7.75
	Coils.	
0.100 and thicker	2.75	3.00
0.050 to 0.099 inc.	2.80	3.05
0.035 to 0.049 inc.	2.95	3.20
0.031 to 0.034 inc.	3.10	3.50
0.025 to 0.030 inc.	3.20	3.60
0.020 to 0.024 inc.	3.30	3.70
0.017 to 0.019 inc.	3.60	4.10
0.015 and 0.016	4.00	4.50
0.013 and 0.014	4.70	5.20
0.012	5.05	5.55
0.011	5.40	5.90
0.010	5.75	6.25

CAST IRON WATER PIPE

Six to 48-in., Cleveland	23.75
Four-inch, Chicago	26.00
Six to 12 inches, Chicago	24.00
Large sizes, Chgo	23.00
Six-inch, New York	20.50 to 21.50
Four-inch, New York	21.50 to 22.50
Four-inch, Birmingham	19.50
Six-inch and larger, Birmingham	19.50

Gas pipe, $1 per ton higher than water.

WAREHOUSE PRICES

Steel bars, Chicago	1.65c
Steel bars, Cleveland	1.80c
Steel bars, Cincinnati	1.75c to 1.80c
Steel bars, Philadelphia	1.70c
Steel bars, New York	1.80c
Steel bars, St. Louis	1.70c
Iron bars, Chicago	1.65c
Iron bars, Cleveland	1.75c
Iron bars, St. Louis	1.65c
Iron bars, Cincinnati	1.70c to 1.80c
Iron bars, Philadelphia	1.55c
Iron bars, New York	1.65c to 1.70c
Hoops, Chicago	2.15c
Shapes and plates, Chicago	1.75c
Shapes and plates, Cleveland	1.90c
Shapes and plates, Cincinnati	1.85c to 1.90c
Shapes and plates, St. Louis	1.80c
Shapes and plates, Philadelphia	1.70c
Shapes and plates, New York	1.85c
No. 10 blue anl. sheets, Chgo	1.95c
No. 10 blue anl. sheets, Cleve	2.05c
No. 10 blue anl. sh. St. Louis	2.00c
No. 10 blue anl. sheets, Cinci	2.00c
No. 28 black sheets, Chgo	2.45c
No. 28 black sheets, Cleveland	2.45c
No. 28 black sheets, Cincinnati	2.45c to 2.55c
No. 28 black sheets, St. Louis	2.55c
No. 28 galv. sheets, Chgo	4.00c
No. 28 galv. sheets, Cleveland	3.50c
No. 28 galv. sheets, Cincinnati	3.40c to 3.55c
No. 28 galv. sheets, St. Louis	3.75c

Freight Rates, Coke

Connellsville regions, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.70
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

IRON AND STEEL SCRAP

(Net Tons.)

No. 1 railroad wrought, Chgo.	$ 8.75 to 9.25
No. 1 railroad wrought, Cleve.	9.75 to 10.00
No. 1 railroad wrought, St. L.	8.00 to 8.50
No. 1 railroad wrought, Cincin.	7.50 to 8.00
No. 2 railroad wrought, Chgo.	8.25 to 8.50
No. 2 railroad wrought, St. L.	7.50 to 7.75
Arch bars and transoms, Chgo.	12.00 to 12.50
Arch bars and transoms, St. L.	11.00 to 11.50
Knuckles, coup. & spr'gs, Chgo.	8.75 to 9.00
Knuckles, coup. & spr'gs, St. L.	8.25 to 8.50
Shafting, Chicago	11.50 to 12.00
Shafting, St. Louis	11.00 to 11.50
Steel car axles, Chicago	10.25 to 10.75
Steel car axles, St. Louis	10.00 to 10.50
Locomotive tires, Chicago	8.50 to 9.00
Locomotive tires, St. Louis	9.00 to 9.25
Cut forge, Chicago	8.25 to 8.75
Pipes and flues, Chicago	6.25 to 6.75
Pipes and flues, Cleveland	7.25 to 7.50

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 lbs. to:—	
New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Minneapolis and St. Paul	32.9 cents
Denver	68.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, (all rail)	80 cents
Pacific coast, via Panama canal	61.9 cents

Pipes and flues, St. Louis	6.00 to 6.50
No. 1 cast, Chicago	9.00 to 9.25
No. 1 cast, Cleveland	10.00
No. 1 cast, Cincinnati	8.50 to 9.00
No. 1 cast, St. Louis	9.00 to 9.25
No. 1 busheling, Chicago	7.25 to 7.75
No. 1 busheling, Cleveland	8.25 to 8.50
No. 1 busheling, Cincinnati	6.00 to 6.50
No. 1 busheling, St. Louis	7.00 to 7.25
No. 2 busheling, Chicago	6.00 to 6.50
No. 1 boiler plate, cut, Chgo.	5.50 to 5.75
No. 1 boiler plate, cut, St. L.	5.50 to 5.75
Boiler punchings, Chicago	8.25 to 8.75
Cast borings, Chicago	5.25 to 5.50
Cast borings, Cleveland	6.00 to 6.25
Cast borings, Cincinnati	4.75 to 5.25
Cast borings, St. Louis	4.75 to 5.25
Machine shop turnings, Chicago.	5.00 to 5.50
Machine shop turnings, Cleve.	5.75 to 6.00
Machine shop turnings, Cinci.	$ 4.25 to 4.75
Machine shop turnings, St. L.	5.25 to 5.75
Malleable agricultural, Chicago	7.50 to 7.75
Malleable agricultural, St. Louis	6.00 to 6.50
Malleable, railroad, Chicago	7.75 to 8.25
Malleable, railroad, Cincinnati	6.00 to 6.50
Malleable, railroad, St. Louis	6.50 to 7.00
Angle bars, iron, Chicago	11.75 to 12.25
Angle bars, iron, St. Louis	9.50 to 10.00
Angle bars, steel, Chicago	8.25 to 8.50
Angle bars, steel, St. Louis	8.00 to 8.25
Stove plate, Chicago	7.75 to 8.00
Stove plate, Cleveland	8.00 to 8.50
Stove plate, Buffalo	8.25 to 8.75
Stove plate, Cincinnati	6.00 to 6.50
Stove plate, St. Louis	6.50 to 6.75
Bundled sheet, Cincinnati	4.75 to 5.25

(Gross tons.)

Heavy melting steel, Pbgh.	$11.75 to 12.00
Heavy melting steel, Buffalo	10.50 to 11.00
Heavy melting steel, Chgo.	9.25 to 9.50
Heavy melting steel, Cleveland.	10.00 to 10.25
Heavy melting steel, Cincinnati	8.50 to 9.00
Heavy melting steel, eastern Pa.	11.00 to 11.50
Heavy melting steel, New York.	8.75 to 9.00
Heavy melting steel, St. Louis	9.50 to 10.00
Grate bars, Buffalo	9.00 to 9.50
Grate bars, New York	6.50 to 7.00
No. 1 railroad wrought, east. Pa.	12.50 to 13.00
No. 1 railroad wrought, Pbgh.	10.25
No. 1 R. R. wght., New York	10.50 to 11.00
No. 1 R. R. wrought, Buffalo	10.50 to 11.00
Shafting, New York	12.50 to 13.00
Shafting, eastern Pa.	15.00 to 15.50
Wrought pipe, New York	8.25 to 8.50
Wrought pipe, eastern Pa.	10.50 to 10.75
Mch. shop turnings, New York.	6.00 to 6.25
Machine shop turnings, Buffalo.	5.75 to 6.25
Mch. shop turnings, Pbgh.	7.75 to 8.00
Mch. shop turnings, eastern Pa.	8.00 to 8.50
Cast borings, New York	5.75 to 6.00
Cast borings, eastern Pa.	8.00 to 8.25
Cast borings, Buffalo	6.50 to 6.75
Cast borings, Pittsburgh	8.25 to 8.50
Stove plate, N. J. points	8.50 to 9.00
Stove plate, Pittsburgh	8.25 to 8.75
Stove plate, eastern Pa.	9.00 to 9.50
Shoveling steel, Chicago	8.75 to 9.50
Shoveling steel, St. Louis	8.00 to 8.50
Reroll. rails, 5 ft. & ov., Pbgh.	12.00 to 12.50
Reroll. rails, 5 ft. & ov., Chgo.	10.00 to 10.50
Reroll. rails, 5 ft. & ov., Cleve.	11.00 to 11.50
Reroll. rails, 5 ft. & ov., E. Pa.	11.50 to 12.00
Reroll, rails, 5 ft. & ov., St. L.	10.00 to 10.50
Steel rails, short, Chicago	10.00 to 10.50
Steel rails, short, Cleveland	11.00 to 11.50
Steel rails, short, St. Louis	9.25 to 9.50
Iron rails, Cleveland nom.	11.75 to 12.00
Iron rails, Chgo.	12.00 to 12.50
Iron rails, Cincinnati	10.25 to 10.75
Iron rails, St. Louis	10.00 to 10.50
Iron rails, Pittsburgh	12.50 to 13.00
Frogs, switches, guards, Chgo.	9.25 to 9.50
Frogs, switches, guards, St. L.	9.25 to 9.50
Car wheels, (iron), Pittsburgh.	11.00 to 11.50
Car wheels, (steel), Pittsburgh.	11.50
Car wheels, Chicago	9.75 to 10.00
Car wheels, eastern Pa.	10.75 to 11.25
Car wheels, Buffalo	10.00 to 10.50
Car wheels, N. J. points	9.00 to 9.25
Car wheels, St. Louis	10.00 to 10.25
Iron axles, Pittsburgh	17.50
Iron axles, Cincinnati	19.00 to 20.00
Iron axles, eastern Pa.	18.50 to 19.00
Iron axles, Buffalo	16.00 to 16.50
Iron axles, Chicago	15.25 to 15.75
Steel car axles, New York	11.50 to 12.00
Steel car axles, Buffalo	12.00 to 12.50
Steel car axles, Cleveland	12.00 to 12.50
Steel car axles, eastern Pa.	14.00 to 14.50
No. 1 busheling, Buffalo	8.50 to 9.00
No. 1 busheling, Pittsburgh	9.75 to 10.00
No. 2 busheling, Buffalo	6.50 to 7.00
Low phosphorus steel, Buffalo	12.50 to 13.00
Low phosphorus steel, Pbgh.	13.75 to 14.00
Low phos. steel, eastern Pa.	14.00 to 15.00
No. 1 forge, eastern Pa.	8.50 to 9.00
No. 1 cast, eastern Pa.	11.75 to 12.25
No. 1 cast, Pittsburgh	11.75 to 12.00
No. 1 heavy cast N. J. points	11.50 to 11.75
Mall. railroad, Cleveland	10.00 to 10.25
Malleable railroad, Pittsburgh	10.00
Malleable railroad, Buffalo	9.50 to 10.00
Malleable railroad, east Pa.	9.25 to 9.75
Bundled sheet, Pittsburgh	9.00 to 9.25
Bundled sheet, Cleveland (nom.)	7.75 to 8.25
Bundled sheet, Buffalo	7.00 to 7.50

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A Tremendous Loss to the Tax Payer

(*Continued from page* 966)

variance with the facts. The second charge made is that the system involves the undesirable speeding-up of men, stimulated by reward and punishment, to their resulting physical, mental, and moral detriment. The features objected to have been in practice for almost four years at Watertown arsenal. An investigation worthy of the name has been made by one body only, a special committee appointed by the house of representatives about two years ago. As a result of this extensive investigation, the committee did not find and did not say that it found anything to the disadvantage of the employes in practice anywhere in the ordnance department.

With such a splendid showing as to the effect of the efficiency system in the government arsenals and navy yards, it seems safe to predict that organized labor's victory in ousting it has been only temporary and that the system will again be restored. The good that the late Frederick W. Taylor did for employe and employer, and for the great industrial world, is lasting.

Keep Record of Electrical Repairs

(*Continued from page* 969)

ious to build their apparatus in any particular style, but all endeavor to place on the market a machine which will best meet the conditions of the operator. If, at frequent intervals, they could examine sheets similar to Fig. 3, compiled at a large number of plants, they would be able to pick out the weak features of their design, and be definitely guided as to the proper modifications to improve their machines. In this manner they could easily determine whether the trouble was local or general, and in case of the former could investigate the apparatus and suggest methods of overcoming the trouble without modifying the apparatus.

It is also advantageous to base an opinion on actual records instead of the personal opinion of an operator, as one superintendent may be satisfied with 20 per cent failure, another very much dissatisfied with 15 per cent. In the former case, the manufacturer would be led to believe that his apparatus operates very satisfactorily, while in the latter the report would be unfavorable.

New Method of Ore Sampling

The method outlined below for sampling cargoes of iron ore at the Lake Erie ports has been devised by the Frank L. Crobaugh Co., Cleveland, to meet a demand for a continuous method which would yield reliable results, on either slow or fast-working docks, at a cost that would permit of more extensive check work.

It being obvious that agreement between operators following the same method under identical conditions is no proof of accuracy, there is developing a tendency toward smaller volume of such data in favor of a practice yielding a more positive check on the correctness of representation.

The sampling shall begin as soon as the surface of the ore has been broken in any of the hatches and continue through each hatch, as nearly as possible a like number of times during the unloading of at least 90 per cent of the cargo. The sample shall be taken from the whole of the worked surface of the ore in each hatch, by taking one scoop full of fine ore or its equivalent in lump as it is encountered every two scoop lengths along parallel lines running lengthwise of the boat and seven scoop lengths apart.

Each can or more of ore as it is thus taken shall be

broken down to ½-inch size, thoroughly mixed, coned, quartered and one-quarter placed in a large storage can provided with a tight-fitting cover.

As soon as the sampling is finished, the ore in the storage can shall be thoroughly mixed, coned and quartered until two alternate quarters approximate 25 pounds in weight, which is placed in a small can provided with a tight-fitting cover and sent to the laboratory.

This sample, on reaching the laboratory, shall be weighed at once for the moisture determination and subsequently prepared for analysis.

Sampling for Sieve Tests

In samples for sieve tests, it is only essential to secure correct proportion of the particles of varying size.

Owing to the method of loading cargoes, the best average of coarse and fine ore is found midway between the center and sides of the boat.

The sample should be taken from each hatch when the ore is approximately one-half unloaded.

Take one scoop full of fine ore or its equivalent of lump every two scoop lengths along parallel lines running lengthwise of the boat midway between the center and each side.

The ore thus taken shall be thoroughly mixed, coned and quartered until one-quarter approximates 25 pounds in weight.

Stock Pile Sampling

For a surface sample start at any convenient point at the base of the pile, taking one scoop full of fine or lump ore as it is encountered every two scoop lengths on a line from the bottom to point of beginning.

Start again on a line parallel with the first and five scoop lengths above it, sampling every two scoop lengths as before and continue thus to the top of the pile.

When an attempt at securing a moisture result is required, 4 or 5 inches of the surface of the ore should be removed before taking each scoop full.

When piles are trenched to permit sampling, take from the surface of the trenches only, one scoop full of fine or lump ore every two scoop lengths on a line parallel with and one-half scoop length above the bottom and on lines parallel with this every three scoop lengths up.

Break all ore thus taken to ½-inch size, mix, cone and quarter, as in cargo sampling.

Car Sampling

Begin at one end of the car and take one scoop full of fine or lump ore every two scoop lengths over the surface of the ore on a line running lengthwise through the center of the car.

If the moisture is to be considered or the cars have been transported to cause a predominance of lump on the surface, 4 to 6 inches of the surface shall be removed with the scoop before taking each scoop full.

The ore thus taken shall be broken to ½-inch size, mixed, coned and quartered, as in cargo sampling.

The Youngstown Iron & Steel Co., Youngstown, which is building a new open hearth steel plant at Lowellville, O., has awarded contracts for two centrifugal hydraulic high-pressure pumps, each to deliver 600 gallons per minute at a pressure of 550 pounds, and two general service pumps with a capacity of 1,000,000 gallons per day each, to the Cameron Pump Co., New York City. Covers and operating mechanism for the soaking pits have been awarded the Youngstown Foundry & Machine Co., Youngstown, and the contract for ingot molds was awarded the Wheeling Steel Casting Co., Wheeling, W. Va.

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Men Wanted
Minimum, 50 words, $1.00. Each additional word, 2c. All capitals, 50 words, $1.50. Each additional word, 3c.

Position Wanted
Minimum, 25 words, 50c. Each additional word, 2c. All capitals, 25 words, 75c. Each additional word, 3c.

Miscellaneous Classified
Minimum, 25 words, $1.00. Each additional word, 4c. All capitals, 25 words, $2.00. Each additional word, 8c.

Remittance should be made to cover eight (8) words for address if box number is used.

SAVE YOUR POSTAGE! When answering advertisements, simply address your replies in the usual manner and send to us for reforwarding under one cover.

Men Wanted

STRUCTURAL DETAILERS WANTED for structural shop in Havana, Cuba. Must be fully experienced, rapid and accurate on mill building work. State experience and salary at once. Permanent position for right men. American Steel Co. of Cuba. Box 654, Havana.

WANTED: — EXPERIENCED FARM implement salesman. Commission basis, but traveling expenses and drawing account advanced. Give experience with references and state drawing account would expect. Address Box 404, THE IRON TRADE REVIEW, Cleveland, O.

WANTED: — A MAN THOROUGHLY conversant with all departments of modern gas range manufacture. Splendid opportunity in a growing concern. Address Box 412, THE IRON TRADE REVIEW, Cleveland, O.

UNDERSIGNED COUNSEL WILL CONFIDENTIALLY negotiate preliminaries for important executive, technical, administrative and professional positions, insuring strictest privacy. Not an agency, but a highly-endorsed, high grade method of negotiating preliminaries only, for $3,000 to $12,000 men. Send address only for explanation. R. W. Bixby, Lock Box 134-E9, Buffalo, N. Y.

THE BEST WAY TO GET A GOOD POSITION in drafting or engineering is to file an application direct with some of our clients who are depending on us to get competent and experienced applicants for their vacant positions. Send stamp for blank and list of vacant positions. The Cleveland Engineering Agency Co., Rose building, Cleveland, O.

Positions Wanted

MECHANICAL ENGINEER; TECHNICAL training; 18 years' experience gas engines, machine tools, mill buildings, hydraulic machinery, ordnance work; 14 years in charge of work; 6 years as superintendent; can fill position of superintendent or chief engineer; good references. Address Box 341, THE IRON TRADE REVIEW, Cleveland, O.

STRIP STEEL MILL SALESMAN, (30) for road or New York representative, experienced in selling hot and cold rolled strip steel, salary or salary and commission. Address Box 419, THE IRON TRADE REVIEW, Cleveland, O.

YOUNG MAN OF GOOD APPEARANCE and address, having ten years experience in the manufacture of open hearth steel, at present assistant superintendent of plant, desires change to a steel or manufacturing company which wants a hustler to understudy business; would like change to sales department; have high executive ability; can organize and handle all kinds of labor with efficiency; correspondence solicited. Address Box 418, THE IRON TRADE REVIEW, Cleveland, O.

WHEN YOU NEED A HIGH GRADE executive, engineer, draftsman or any technical man, consult The Engineering Agency, Inc., (Est. 21 years) 1662 Monadnock Block, Chicago.

Positions Wanted

OPERATING SUPERINTENDENT AND efficiency executive of crucible, electric and open hearth steel plants and rolling mills, fully qualified by seventeen years successful plant management experience, desires position wherein practical metallurgical, producing, economic, statistical and financial experience are required. Address Box 409, THE IRON TRADE REVIEW, Cleveland, O.

STEEL FOUNDRY SUPERINTENDENCY by aggressive, competent man; crucible, electric or open hearth plants preferred. Expert knowledge of mixtures, melting, molding, casting and cost. Savings effected; refinements introduced. Address Box 410, THE IRON TRADE REVIEW, Cleveland, O.

YOUNG MAN, TECHNICAL TRAINING, experienced, desires advancement from present position to situation offering larger future in iron, steel or brass works. Address Box 414, THE IRON TRADE REVIEW, Cleveland, O.

EXPERIENCED PATTERN MAKER wishes position as foreman; over 10 years in charge of shops employing from 20 to 100 men making patterns for gas and oil engines and electrical machinery. Broad experience with molding machines. Address Box 253, THE IRON TRADE REVIEW, Cleveland, O.

POSITION WANTED AS FOUNDRY superintendent or foreman; stove preferred. Can handle men efficiently. Have also had experience on match plate and molding machine. Looking for something permanent. Address Box 372, THE IRON TRADE REVIEW, Cleveland, O.

MECHANICAL ENGINEER, WITH AN experience of more than 25 years in the design of traveling cranes, hoisting and conveying machinery, rolling mill and steel works equipment, including also steam hammers, hydraulic machinery, ship yard machinery, etc., desires a position in the capacity of designing or chief engineer with a crane builder or a firm specializing in the manufacture of iron and steel works machinery. High-grade ability to design machinery from the standpoint of originality and economical shop production, together with great speed and accuracy in drawing office work. For a period of 18 years was connected with a concern of high standing in the building of traveling cranes and rolling mill equipment, latterly in the capacity of designing engineer and assistant to chief engineer. For five years was employed by another large crane builder in charge of the department of design of standard and special steel works cranes and for several years was designing engineer with another well-known builder of ore traveling cranes, electric monorail hoists, locomotive cranes, etc. References high grade and satisfactory in every respect. Address Box 425, THE IRON TRADE REVIEW, Cleveland, O.

IT WILL PAY YOU TO MAKE KNOWN your employment wants through THE IRON TRADE REVIEW when in need of classified service. In doing so, practice economy, run a four-time ad and save the 10 per cent allowed from the above rates on such orders.

Positions Wanted

MINE SUPERINTENDENT, MINING engineer desires similar position, ten years experience, five years superintendent of iron mine. At present employed, desire change to better living conditions. Will start on moderate salary with chance for advancement. Address Box 416, THE IRON TRADE REVIEW, Cleveland, O.

POSITION WANTED AS FOUNDRY foreman; experienced on gas engine work; general jobbing; good cupola practice; A-1 references. Address Box 417, THE IRON TRADE REVIEW, Cleveland, O.

OFFICE MANAGER, FACTORY OR cost accountant, 30 years of age with 12 years practical experience, capable to analyze, install or perfect complete factory system. Highest testimonials. Address Box 254, THE IRON TRADE REVIEW, Cleveland, O.

I AM AN EXPERT IRON ORE OPERATOR. Married, age 39, 14 years service with one company, 5 years as superintendent. Understand thoroughly and have worked all methods of iron ore mining, including slicing, caving, milling, backstopping and open pit. Am a mining engineer. I can produce maximum results at minimum costs. Initial salary not so important as position offering a future. Best references. Address Box 297, THE IRON TRADE REVIEW, Cleveland, O.

Opportunities

For Sale:—Unusual opportunity. A long established and successful machine and general engineering business. Includes several profitable specialties, New York. Offered at a sacrificed price, $9,000.00 on account of ill health of owner. Will safely net 33 per cent to purchaser. Would consider desirable partner. Address Box 406, THE IRON TRADE REVIEW, 90 West St., New York.

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WOULD LIKE TO INTEREST AN experienced business man to invest capital and take active interest in company with modern factory, manufacturing boilers and steel-plate work. Principals only. Strictly confidential. Call or write R. M. S., Room 303, 261 Broadway, New York, N. Y.

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